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NYASALAND PROTECTORATE.

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ANNUAL
MEDICAL & SANITARY
REPORT

For the year ending 31st December, 1934.

PRICE 4s.

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MEDICAL AND SANITARY SERVICES,
ZOMBA,
NYASALAND.

25th April, 1935.

Sir,

I have the honour to submit for the information of His Excellency the Governor and for transmission to the Right Honourable the Secretary of State for the Colonies, the Medical Report on the Health and Sanitary Conditions of Nyasaland for the year 1934, together with the Returns etc., appended thereto.

I have the honour to be,
Sir,
Your obedient Servant,
A. D. J. B. WILLIAMS,
Director of Medical Services.

The Hon. The Chief Secretary to the Government,
Zomba.

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SECTION I. ADMINISTRATION.

A. STAFF.

The staff sanctioned for the year 1934 was:

(a) European.

Director of Medical Services.
Senior Health Officer.
Senior Medical Officer.
Medical Entomologist.
14 Medical Officers.
Pathologist.
Matron.
10 Nursing Sisters.
2 Sanitary Superintendents.
Clerk and Medical Storekeeper.

During the year the staff was brought up to full establishment.

(b) Asiatic.

10 Sub-Assistant Surgeons (provision for nine and and one temporary relief).

(c) African.

12 Clerks.
1 Laboratory Assistant (new appointment).
11 Hospital Assistants (a reduction of 7 from 1933).
182 Dispensers and Probationers.
16 Sanitary Inspectors (an increase of 1 from 1933).
40 Vaccinators.
246 Hospital and Dispensary Attendants and Servants.
18 Medical Store Assistants, Packers etc.
5 Messengers.

A varying number of Sanitary Labourers, etc., averaging 240.

Principal appointments, promotions, changes, etc., made during the year:—

Appointments:—

	Date
Dr. H. M. Shelley, to be Pathologist (previously served as Medical Officer)	1. 1. 34.
Miss B. Wells, Nursing Sister	15. 3. 34.
Miss E. M. R. D. Davies, Nursing Sister	21. 6. 34.
Miss F. McQuire, Nursing Sister	27. 9. 34.
Jemadar Bansi Lal, Sub-Assistant Surgeon	25. 7. 34.

Acting Appointments:—

Dr. H. H. B. Follit, Senior Health Officer to be acting Director of Medical Services from	1. 1. 34. to 13. 2. 34.
Miss N. M. Cremen, M.B.E., Nursing Sister to be acting Matron from	1. 1. 34. to 12. 1. 34.

Transfers:—

Miss J. H. Marr, Nursing Sister to the Gold Coast	26. 9. 34.
Miss A. Munro, Nursing Sister to Hong Kong	10. 3. 34.

Retirements:—

Nil

Resignations.

Miss I. M. M. Aitken, Lady Medical Officer	19. 1. 34.
Miss R. K. Ault, Nursing Sister	20. 1. 34.

Termination of Appointment:—

Jemadar Siraj-ul Haq Khan, Sub-Assistant Surgeon reverted to I. M. D.	27. 10. 34.

Deaths:—

Miss I. A. Frame, Nursing Sister, died in the United Kingdom ...	23. 5. 34.

B. LIST OF ORDINANCES, ETC., ENACTED DURING 1934 AFFECTING PUBLIC HEALTH.

ORDINANCE NO. 2 OF 1934.

To amend the Sanitary Boards Ordinance 1929.

ORDINANCE NO. 5 OF 1934.

To amend the Dangerous Drugs Ordinance 1932.

ORDINANCE NO. 24 OF 1934.

To amend the Medical Practitioners and Dentists Ordinance 1926.

GOVERNMENT NOTICE NO. 4 OF 1934.

Amendment to the bye laws of Blantyre and Limbe Town Councils.

GOVERNMENT NOTICE NO. 26 OF 1934.

Appointment of members. Zomba Town Council.

GOVERNMENT NOTICE NO. 29 OF 1934.

Declaration of certain districts as Sanitary Areas (Chiromo, Dedza, Fort Manning, Karonga, Lilongwe, Lunzu).

GOVERNMENT NOTICE NO. 30 OF 1934.

Dedza Sanitary Board Rules.

GOVERNMENT NOTICE NO. 35 OF 1934.

Declaring Amoebic Dysentery as an infectious disease.

GOVERNMENT NOTICE NO. 41 OF 1934.

Amendment to the bye laws of Blantyre and Limbe Town Councils.

GOVERNMENT NOTICE NO. 68 OF 1934.

New bye laws made by the Limbe Town Council (Limbe Native Location bye laws, 1934).

GOVERNMENT NOTICE NO. 72 OF 1934.

Public Health Ordinance 1932, Consolidation of the Epidemic and Contagious Diseases Ordinance 1903, the Infectious Diseases (Notification) Ordinance, 1908, and the Vaccination Ordinance, 1908.

GOVERNMENT NOTICE NO. 102 OF 1934.

New bye laws made by the Limbe Town Council (Limbe Electricity bye laws, 1934).

GOVERNMENT NOTICE NO. 115 OF 1934.

New bye laws made by the Zomba Town Council (Zomba Township bye laws. 1934).

C. FINANCIAL.

REVENUE AND EXPENDITURE.

The total expenditure for 1934 was £49,138 4s. 3d. an increase of £3,740 13s. 9d. on the expenditure for 1933.

The total expenditure represents approximately one eighth part of the total revenue of the Protectorate. The total revenue of the Department was £1,839 17s. 10d. this amount being made up by,

(*a*) Hospital Fees	£1,071	4	10
*(*b*) Sale of Drugs, etc., ...	768	13	0
Total	£1,839	17	10

* In addition 5,139 bottles of 100 tablets of bihydrochloride of quinine and 264 packets of quinine sulphate were sold to the public from unallocated stores and realised the sum of £1,009 2s. 10d. The sales of quinine show an increase in comparison with those of last year, when 4,900 bottles and 194 packets were sold at a cost of £980 16s. 2d.

	£	s.	d.
Approved Expenditure—1934	48,920	0	0
Actual Expenditure 1934:—			
MEDICAL:			
Personal Emoluments	28,193	13	7
Other Charges	14,469	12	9
SANITATION:			
Personal Emoluments	4,702	3	11
Other Charges	1,772	14	0
Total Expenditure	£49,138	4	3

COLONIAL DEVELOPMENT FUND.

A sum of £2,350, approximately, was expended during the year from the balance of the Colonial Development Fund and provided an X-ray apparatus for the new Native Hospital at Zomba and various articles of equipment. £170 was expended on the improvement of village water supplies.

SECTION II. PUBLIC HEALTH.

A. GENERAL REMARKS.

During 1934 the Department was at full strength, the only casualty occurring in the ranks of the Sanitary Superintendents, one of whom was invalided during the year. Fortunately a qualified Sanitary Superintendent was available locally; he was engaged on a temporary basis.

Dr. H. H. B. Follit, Senior Health Officer acted as Director of Medical Services for the first month and a half of the year, he proceeded on leave in June and during his absence Dr. T. A. Austin was brought into Headquarters and rendered most valuable service.

We were very fortunate during the year to receive a visit from a distinguished colleague, namely, Professor J. G. Thomson of the London School of Tropical Medicine. During his visit he was engaged chiefly on a joint investigation with Dr. W. A. Lamborn on the mechanical transmission of the pathogenic protozoa by non-biting haematophagous muscids. The problem of malaria was also studied and the results of his activities are awaited with interest. During his visit Professor Thomson was always ready and willing to give the benefit of his great experience to Medical Officers whether in the employ of the Government or not and it would be of inestimable assistance to the Medical service in particular and to the country in general if regular visits of experts from Tropical Schools could be arranged for.

In pursuance of the policy foreshadowed by the inauguration of the Colonial Medical Service, the Department was re-organized to allow of the Director having the services of an Assistant at the Head Office, and the unnecessary partition splitting the Department into a Medical and Sanitation division was removed.

The energy of the Department during the year has been directed in the main to the collection of information with regard to the conditions, physical and pathological, of the native population in the rural areas and every penny that could be spared has been expended on transport in order to assist Medical Officers to visit their districts and so to get into more intimate touch with the native inhabitants.

The Head of the Department was able to visit every station at least once during the year and was thus enabled to learn at first hand the peculiar difficulties and problems that presented themselves in each locality.

The rural dispensary scheme, although outwardly flying the flag of the Department was found to be, principally through lack of supervision, in a somewhat stagnant state, the native staff, with few exceptions, had grown rusty and had forgotten to a large extent the little they had learnt in the way of medical knowledge.

Re-organization is now in progress and it is anticipated that, by bringing in the native dispensers for regular 'refresher' courses of training at the central hospitals and by more frequent visiting of the dispensaries by the Medical Officers, considerable improvement will take place. From statistics already obtained it would appear that the public health and general conditions prevailing in the rural areas are unsatisfactory.

Certain features of rural life are however, favourable for 'bonification' measures, e.g., houses are, in the majority of districts, grouped together into villages and in every district a fair proportion of well constructed houses is to be seen.

A 'stimulus' is required to set the ball rolling, the native himself is ready and willing to learn, but more teachers are needed.

It is obvious that the Medical Officer with the multifarious duties he is expected to perform, has not the time to penetrate all the recesses of his district, he must work through assistants and the assistants must themselves be natives.

There is, therefore, a great incentive for the training of Africans who will be capable of instructing their fellow creatures in the methods of the prevention of disease, in village hygiene, in the construction of better houses and in the sanitary education of the people.

By such means and by such methods will the economic progress of the country be assured.

The expansion of the public health services and more especially those relating to infant welfare and maternity work should ensure not only a decline in the present appalling infant mortality but in the production of a more healthy and virile race.

The slogan for Medical Departments in the Colonies should be "Sanitation and more Sanitation and the Education of the women and children".

MEDICAL ASSISTANCE TO NON-OFFICIAL BODIES.

Financial assistance to the extent of £900 was afforded to Missions undertaking the treatment of lepers.

As in past years the grant of £325 a year was continued in respect of the Blantyre Mission Hospital in order that the Natives and Asiatics in Government employ at Limbe and Blantyre should be provided with hospital treatment when so recommended by a Government Medical Officer.

Drugs and dressings to the value of £768 were sold at cost price to employers of labour maintaining dispensaries and to some extent to Missions performing medical work. Free issues of drugs to the value of approximately £100 for the treatment of leprosy and hookworm were also made to the non-official institutions undertaking such work.

RETURNS FOR THE YEAR.

The number of In and Out-patients treated during the year is compared with the numbers treated for previous years in the following table:—

	1930	1931	1932	1933	1934
Europeans :					
In-patients	146	190	189	178	188
Out-patients	1,164	1,367	1,079	1,217	1,308*
Total	1,310	1,557	1,268	1,395	1,308
Africans and Others:					
In-patients	3,958	5,160	6,325	7,322	9,044
Out-patients	225,361	267,457	308,862	353,344	375,852
Total	229,319	272,617	315,187	360,666	375,852*

*NOTE. In the above figures the OUT-PATIENT figures include the IN-PATIENTS.

The number of AFRICAN IN-PATIENTS shows a considerable increase and demonstrates that as the natives acquire increased confidence in European methods, more use will be made of the hospital system. The number of OUT-PATIENTS includes the number of patients treated at rural dispensaries.

INCIDENCE OF DISEASES ACCORDING TO GROUPS.

	Hospitals		Rural Dispensaries.	
1. Epidemic, Endemic and Infectious Diseases	13,200		20,845	
2. General Diseases	1,215		398	
3. Affections of Nervous System	9,200		22,860	
Eyes		6,301		16,140
Ears		2,390		6,487
4. Diseases of the Circulatory System	322		144	
5. Diseases of the Respiratory System	12,574		35,572	
6 Diseases of the Digestive System	24,525		46,057	
Ankylostomiasis		3,627		3,406
Constipation		16,450		20,504
7. Diseases of the Genito-urinary System	2,986		2,593	
8. Puerperal State	149		24	
9. Affections of Skin and Cellular Tissue	30,244		63,703	
Ulcers		9,739		29,895
Scabies		14,022		19,328
10. Diseases of Bones and Organs of Locomotion	3,739		10,376	
11. Malformations	11		—	
12. Diseases of Early Infancy	21		—	
13. Affections of Old Age	89		—	
14. Affections produced by External Causes	15,581		49,553	
15. Ill-defined Diseases	2,257		8,922	
Total	118,113		261,047	

The following diagrams I-IV show the incidence of the epidemic, endemic and infectious diseases, the proportion of these diseases treated at hospitals and the proportion of in-patient deaths amongst the diseases in Group I and in all groups of diseases.

DIAGRAM I.

Showing the proportion of infectious, systemic and other diseases treated at the Government hospitals. (Excluding rural dispensaries).

Total incidence 116,113.

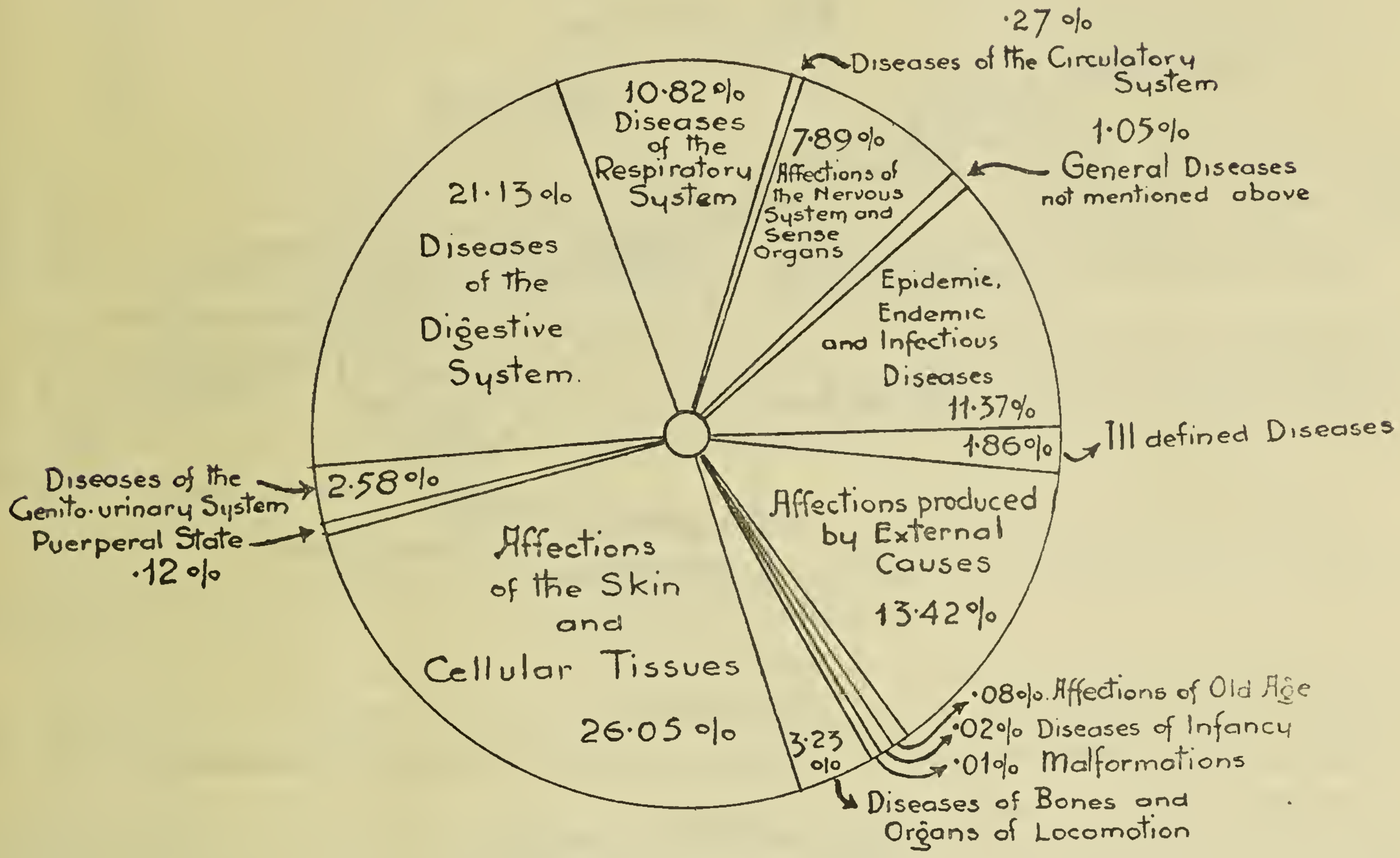


DIAGRAM II.

Showing the proportion of in-patient deaths amongst the groups of diseases. Total in-patient deaths 203 = 2.09 per cent. of all in-patients.

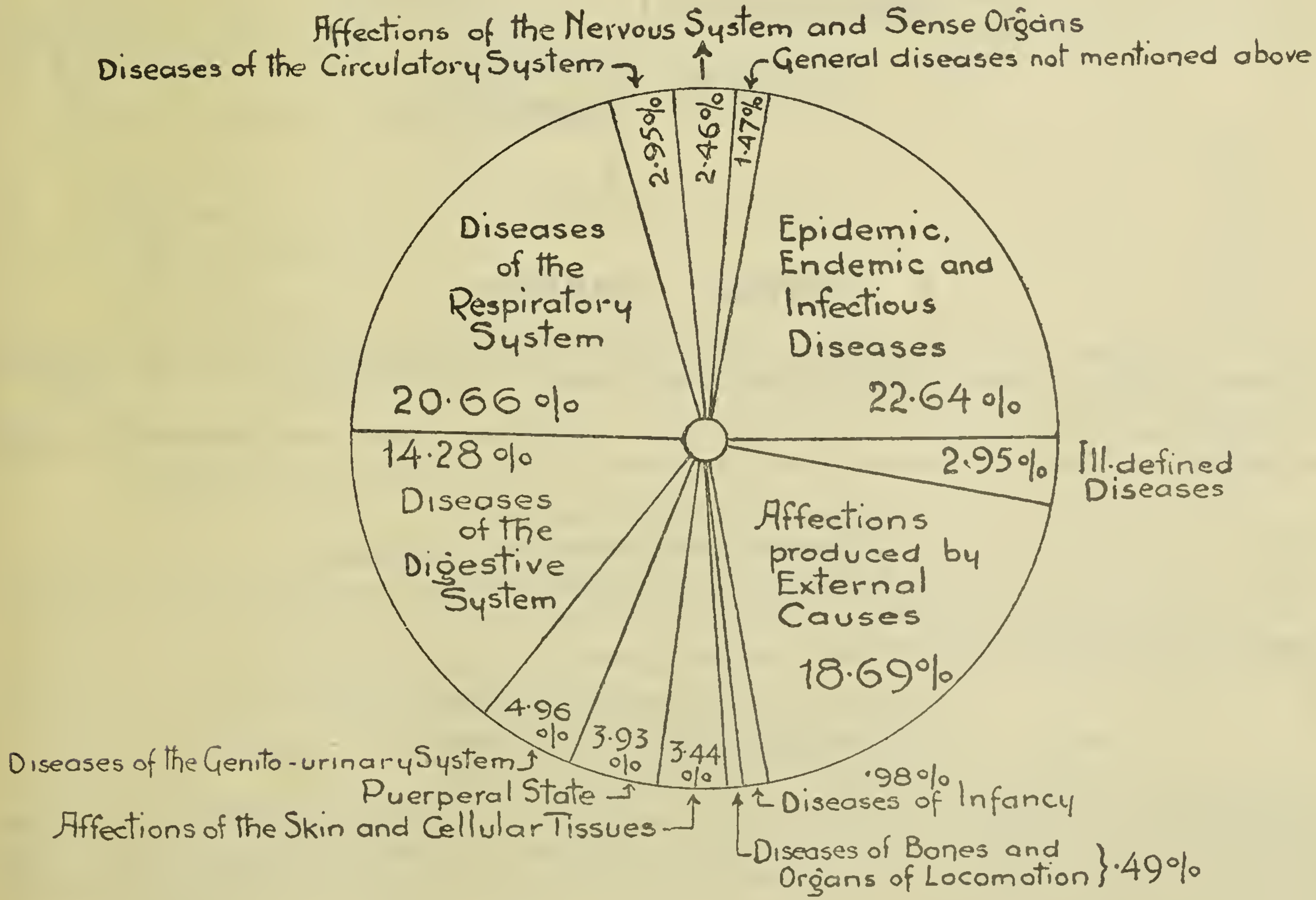


Diagram III.

Total incidence of epidemic, endemic and infectious diseases 13,200.

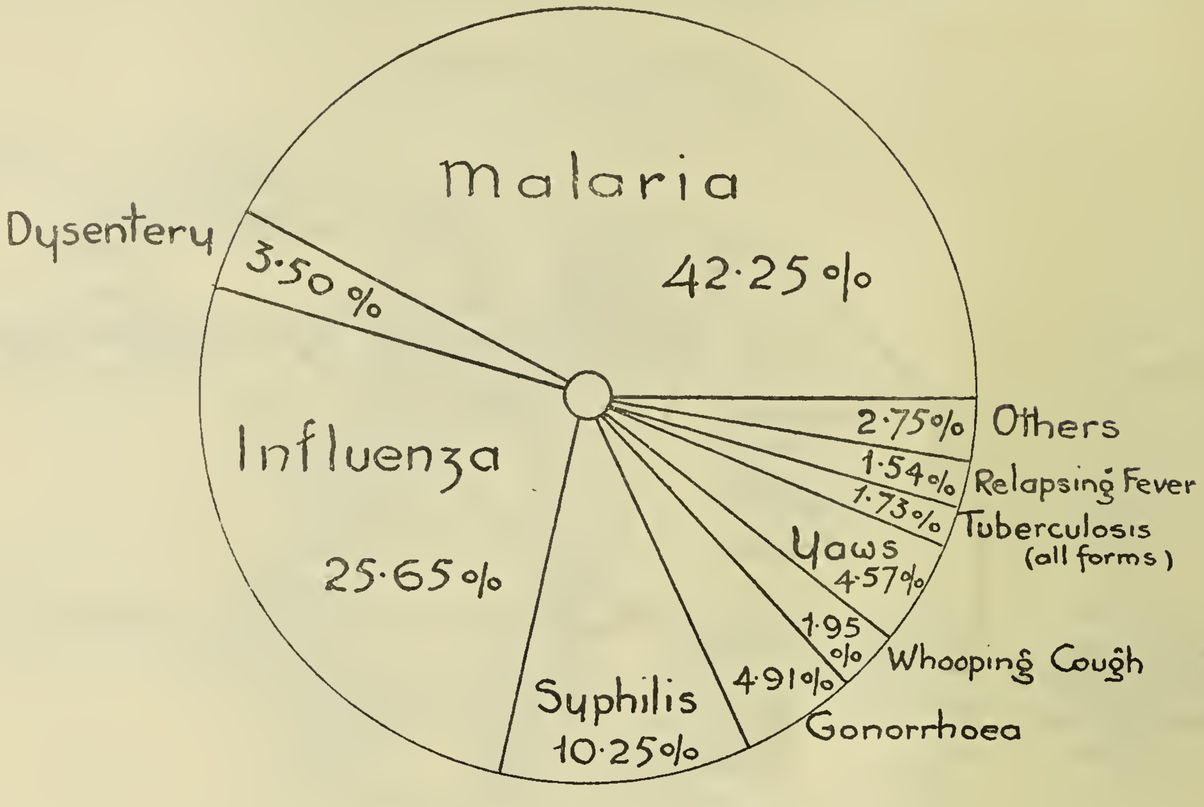
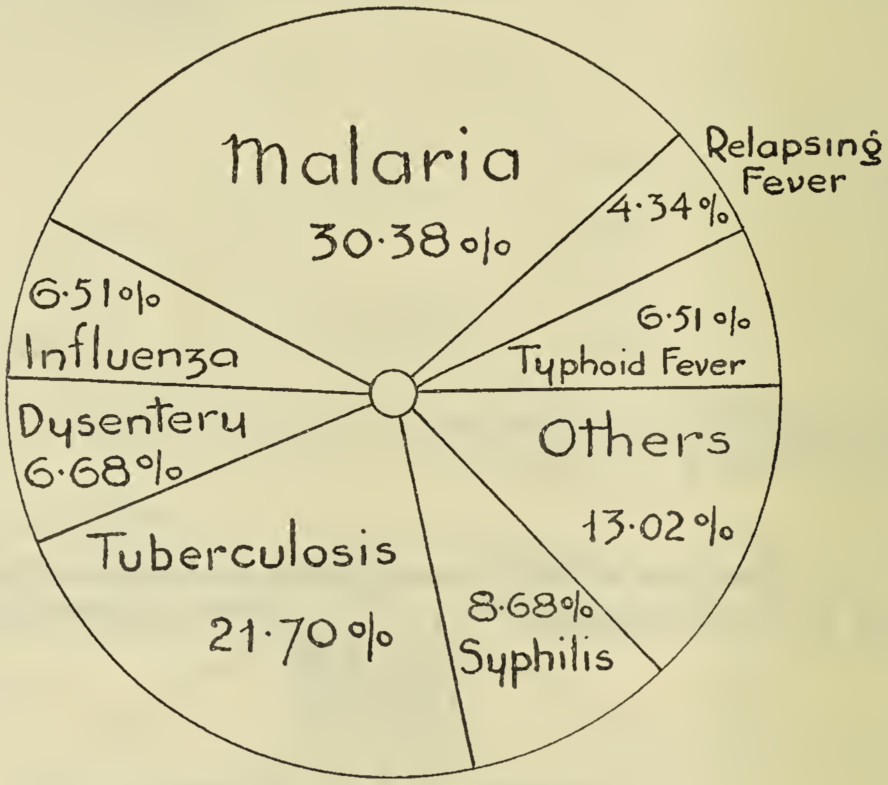


Diagram IV.

Total in-patient deaths amongst the epidemic, endemic and infectious diseases 46.



B. GENERAL DISEASES.

Malignant disease. The total number of cases reported during the year was 26 as compared with 18 cases in 1933, 30 cases in 1932 and 29 cases in 1931.

The Pathologist was on leave for half the year. 10 tumours were sent to the Laboratory for examination, 5 of these were found to be malignant and were classified as follows :—

1. Melanotic sarcoma (one case).
2. Spheroidal celled carcinoma (one case).
3. Epithelioma (three cases).

Among the cases dealt with at Native hospitals were ;—

one case of mixed tumour of parotid.
one case of carcinoma of the larynx.
one case of carcinoma of the penis.

Rheumatism. The number of cases of acute rheumatism reported was 62 and of chronic rheumatism 679. The figures show a considerable decrease over those of the previous year, no doubt due to the more correct reporting of cases under the proper sections. The total number of cases reported in 1933 was 1,816.

The figures for cases of acute rheumatism are probably optimistic as 55 out of 62 cases occurred as out-patients. True cases of acute rheumatism are thought to be exceedingly rare.

Deficiency Diseases. The number of cases of deficiency disease occurring during the last five years are compared in the following table :—

	Scurvy	Pellagra	Beriberi	Rickets
1930	137	252	1	—
1931	—	94	1	—
1932	3	104	1	—
1933	—	1	—	—
1934	100	42	1	5

As usual almost half of the number of cases of pellagra occurred amongst the inmates of the Central Prison; here the staff is very much on the *qui vive* for cases owing to their regular annual occurrence. No explanation is offered with regard to the single case occurring during last year as general conditions, including the dietary, remained exactly the same as in the previous years.

With regard to the cases of " Scurvy " reported, discretion must be used in accepting these figures as representing a true state of affairs. All the cases reported were treated as out-patients at a small dispensary in charge of a Native hospital assistant, and occurred in a district where so far as can be ascertained no especial conditions of famine or any dietetic difficulties were experienced.

Five cases of rickets were reported, one in an European child and four amongst natives.

Spleno-Medullary Leukaemia.—Spleno-Medullary Leukaemia is of sufficiently rare occurrence at any rate in Nyasaland as to warrant mention in this Report.

A case of this disease was reported by Dr. W. L. Gopsill, in the Cholo District during the year.

The patient was an adult male of some 25 years, and was admitted with a large swelling in the abdomen, vomiting and breathlessness.

The swelling was determined to be an enlarged spleen reaching over the middle line and extending down to the lower limits of the abdomen. The total leucocyte count was 480,000 per cu. m m. The case was also remarkable for the pathological museum the patient presented.

Ova of *Ankylostoma* and *Ascaris* were present in the faeces. Eggs of *Schistosoma haematobium* were present in the urine.

One month after admission cysts of *Entamoeba histolytica* were found in the faeces.

A nodule in the skin just below the 8th right rib on excision revealed the presence of *Onchocerca volvulus.*

C. COMMUNICABLE DISEASES.

(*a*) Mosquito or Insect Borne.

Malaria. The total number of cases reported during the year amounted to 14,044 as compared with 9,787 for 1933. The incidence of malaria in the group of communicable diseases for 1932 was 23.41 per cent. for 1933, 42.82 and for the year under review 42.25 per cent.

The cases treated at hospitals are classified as follows :—

Sub-tertian	1,262
Quartan	51
Benign tertian	708
Cachexia	197
Type undefined	3,593

The following deaths from malaria occurred during the year.

European	1
Asiatic	Nil.
Native	13

As malaria is endemic throughout the country it is the practice of the majority of Europeans to take prophylactic doses of quinine; usually gr.v of the bihydrochloride is taken daily at sun-down. Quinine is for sale at all Post Offices (36 in number) and is sold at cost price to Government.

Some interesting figures obtained by examination of numbers of unselected children are included in section VI under " Medical Surveys ".

Blackwater Fever. During the year 13 cases of blackwater fever occurred.

The distribution by race and the number of cases as compared with last year is as follows :—

	1933	1934
European	3	5
Asiatic	5	4
Native (including half castes)	—	4

One death occurred in a European who was brought into hospital "in extremis".

Of the 13 cases, seven occurred at the lower altitudes along the Lake shore and the Shire River, three in the Blantyre, Zomba, Mlanje districts, and three at higher altitudes.

Relapsing Fever. During the year, 197 cases were reported as compared with 191 cases for last year.

No case occurred amongst Europeans.

In certain districts the source of infection is supplied from neighbouring territories by the annual influx of alien labour.

In other districts native customs and superstitions play their part in the dissemination of the disease as in some tribes it is usual, when travelling and in order to ensure freedom from Tick Fever, for the person travelling to carry a tick with him.

Trypanosomiasis. Returns showed that 5 cases occurred during the year as compared with 32 cases in 1933 and 10 in 1932. 4 cases occurred in the only endemic area in the Kota-Kota district.

The fifth case occurred in an alien native who came from Tete in Portuguese territory and who had passed through a fly belt some five months previous to his admission to hospital.

(*b*) INFECTIOUS DISEASES.

Smallpox. See Section III.

Yaws. During 1934, 2,683 cases were treated as compared with 1,966 cases in 1933 and 2,672 cases in 1932.

Yaws is distributed chiefly along the Lake littoral and in the Lower Shire district.

Cerebro-spinal Meningitis. During the year one case only was treated at a hospital as compared with 12 cases for 1933.

A small outbreak occurred in the Fort Johnston district (village of Mchenga) during the month of January. This village is close to the villages of Chowe and Mala Kulo where a small epidemic occurred last year. There were six cases with four deaths; a strict quarantine was observed until the middle of March.

Enteric Group of Fevers. Only seven cases were reported as against twelve for 1933. Unfortunately in none of these cases was the type determined by Laboratory investigation. One case only occurred amongst Europeans.

Undulant Fever. For the first time in this Protectorate two cases of undulant fever were diagnosed in the Blantyre district.

Both cases exhibited a prolonged type of fever not responding to any of the usual measures, in the one case the blood-serum agglutinated to high dilutions, in the other the serum was positive only in certain dilutions.

The milk supply was obtained from two different herds, in one of which a cow had previously aborted; this animal was examined by the Veterinary pathologist with negative results. In the case of the other herd no past history of abortion was obtained and the Veterinary Officer considered there was no reason to suspect the presence of any infection. No cases of contagious abortion were known to have occurred in the Protectorate. The patients were both Europeans and both made a good recovery.

Dysentery. A total of 2,135 cases of dysentery was reported for the year as compared with 1,692 cases in 1933 and 2,450 in 1932. 429 cases were treated at hospitals, of these 256 were amoebic, 25 bacillary and 148 undifferentiated.

Among Europeans 53 cases of amoebic, 2 cases of bacillary and 4 cases of undefined dysentery occurred.

At Zomba, the incidence of amoebic dysentery continued to increase and 33 cases occurred as compared with 22 in 1933.

A most interesting *resumé* of the incidence and history of amoebasis in Zomba is given as an appendix to this Report.

Leprosy. There are in this country 12 clinics all administered by Missions at which lepers are treated either as in-patients or out-patients or both. All of them receive money grants from Government in proportion to the number of cases treated.

Arrangements in regard to staff, housing and maintenance of patients at the various clinics vary considerably. Some have a doctor in charge, with a qualified nurse and native subordinates, the majority are in charge of a qualified nurse. Housing varies from wattle and daub huts to well built red-brick structures. At some centres the lepers have been encouraged to grow their own food supplies, at others food is bought in bulk by the Mission concerned. One or two of the Missions have started schools for the lepers and though the majority of lepers may not be able to gain much knowledge from the instruction given, it is of great benefit to them to have their interest aroused and their minds distracted from their unfortunate physical condition.

The numbers under treatment at the Leper Centres, and admissions, discharges and deaths are as follows:—

Name of Centre	Average No. of patients per quarter.		Admissions.		Discharges.		Deaths.	
	Male	Female	Male	Female.	Male	Female	Male	Female
Bandawe	30.5	35.5	4	2	—	—	—	3
Domasi	18.75	13.2	4	5	3	3	—	—
Likoma	9.5	6.75	1	2	1	—	—	—
Likwenu	46	24	17	5	7	1	—	—
Livingstonia (Outpatients)	41.75	35.25	—	—	—	—	1	3
Loudon	12.5	6.75	2	—	3	—	1	—
Malamulo	164.25	44.25	62	26	19	7	6	—
Malindi	19	10	1	—	2	1	1	—
Mkhoma	4.75	4.75	2	—	1	2	—	—
Mua	42.25	22	9	3	5	—	4	2
Mwami	22.25	12.25	4	3	—	—	1	—
Utale	61.5	24	22	8	11	2	2	1
			128	54	52	16	16	9

In addition to the cases maintained and treated by the Missions, 120 male and 31 female lepers were treated as out-patients by Government Medical Officers.

One European under treatment for leprosy has so far improved that he now shows no obvious signs or symptoms of the disease.

During the year the following leper treatment centres were visited by the Director of Medical Services,

Bandawe.
Likwenu.
Malamulo.
Mua.
Utale.

The great interest taken by the Missions under whose auspices the treatment of this disease is carried out, is noted with pleasure.

Tuberculosis. The record of all forms of this disease treated at hospitals during the past seven years is appended:—

1928	1929	1930	1931	1932	1933	1934
73 ...	70 ...	128 ...	171 ...	220 ...	104 ...	228

This disease presents a distinct problem especially in the hot damp climate of the Lake shore. Patients coming to a hospital for treatment will seldom stay for longer than a few weeks especially when they realise that little progress is being made. They return to their unhygienic huts and the disease is further disseminated.

During next year an investigation is to be made on a number of unselected children in the Fort Johnston area to find out the percentage affected with tuberculosis, by use of Moro's Inunction Test.

Venereal Disease.

Syphilis. 1,324 cases of syphilis were treated at hospitals as compared with 1,383 cases in 1933.

Although the actual number of cases treated shows a slight decrease as compared with last year, yet it is considered that increasing confidence in European methods of treatment is being displayed, for example, at one hospital out of a total of 120 cases treated, 64 were cases of primary syphilis. Rural Dispensers are advised to send all cases of syphilis to hospital for treatment and in the Departmental Circular dealing with the "Reorganization of Rural Dispensaries" it is especially laid down that all cases of syphilis *must* be referred to the central hospital for treatment unless the dispenser is capable of administering intravenous or intramuscular injections.

Gonorrhoea. 1,093 cases were treated during 1934 of which 219 were in-patients and 874 out-patients. It is exceedingly difficult to make the natives realise the seriousness of this disease and to impress on their minds the ill-effects that may follow and the necessity for early and regular attendance. Cases of this disease are not now dealt with at rural dispensaries except in special circumstances.

D. Vital Statistics.

(i) GENERAL AFRICAN POPULATION.

Figures for the total native population show a slight increase, the 1931 census gave a total of 1,599,888 whereas in 1926 the total was 1,199,934. The estimated total for 1934 is 1,600,713.

The registration of births and deaths is not compulsory, but the experiment in registration commenced in the Fort Manning district in 1932 was continued. Dr. Follit writes,

> "In the Annual Medical Report for 1933 it was stated that the figures obtained in this district, though subject to a wide margin of error do show certain features which appear to be constant and not due to errors or omissions on the part of the native recording staff. That statement is supported by the figures obtained for 1934, which show the same

slight excess of female over male births, of female over male still-births, and of female over male deaths in the adult age-group. As regards the latter, even allowing for 10 per cent. excess of females the disproportion of deaths in marked.

Infantile mortality appears to show definite periods of rise and fall, a rise from March to September—the dry, cold period, and a fall from October to February, the period of the rains. The ratio of infant deaths during the five months of the wet season to those of the dry season is approximately 1 : 3.5.

As the registration of births and deaths amongst the native population has been undertaken only in the Fort Manning district, it is not known whether the above mentioned features are common to the whole country or are peculiar to this particular district.

Registration is now (1935) to be undertaken also in the Karonga district, so that in the course of a few years another set of figures relating to a population differing in tribal habits and customs and in geographical situation will be available for comparison."

The estimated population of Fort Manning district is 35,500 and the various rates are compared for the years 1932, 1933 and 1934.

	1932	1933	1934
Birth rate per thousand	67.2	68.2	52.6
Death rate ,, ,, ...	33.	25.8	27.7
Infantile death rate per thousand births	141.3	97.3	154.6
Still-birth rate per thousand live births	—	89.3	75.8

For 1934 the births were 994 male and 1,050 female.
,, deaths were 443 ,, ,, 540 ,,
,, infant deaths were 156 ,, ,, 160 ,,
,, still-births were 74 ,, ,, 81 ,,

The percentage figures by age groups are as follows :—

	Deaths in age period		Percentage of total deaths	Population 1931 census.		
	Male	Female		Male	Female	Total
0—1 years ...	156	160	32.2	4,367	4,321	8,688
1—5 years ...	91	104	19.8			
5—15 years ...	66	62	13.0	3,092	2,685	5,777
Over 15 years ...	130	214	35.0	8,773	10,867	19,640

Dr. Watson in the Dedza district by the kind permission and co-operation of the 'White Fathers' was also fortunate enough to secure some interesting vital statistics while making a medical survey of the Ntakataka Mission School. The conclusions drawn bear a close resemblance to those of the Fort Manning district. Dr Watson's report reads as follows :—

" The following statistics have been completed from the Registers of Baptisms and Deaths of the Ntakataka Mission of the White Fathers.

As their registers are kept for religious purposes only, they cannot be expected to produce figures complete for statistical use.

Such a christian community may only be compared within narrow limits to the general population, because the christian community increases more rapidly by the addition of converts who are for statistical purposes, immigrants. Again, the Mission is not yet thirty years old so that sufficient numbers of completed lives are not yet available. It is therefore of little use, under the circumstances, to try to work out birth and death rates. Despite these disadvantages quite reliable information may be gleaned from the figures as they stand.

2. The period picked for investigation was from 1st June, 1919, to 31st May, 1934. The reason for the choice of this fifteen year period was that during the war years occasional gaps were present in the register.

3. As regards the age grouping, the period 0—2 years was chosen to try and gain some information on infant mortality, the native child suckles up to two years, is much later in walking than the European child and generally speaking is dependent on the mother until two years of age.

The following figures were obtained.

4. Births during the fifteen years, Males, 1,531 ; Females, 1,629.

Deaths during the same period.

Age group.	Sex.	Actual numbers.
0—2 years	M.	342
	F.	372
2—5 years	M.	75
	F.	109
5—15 years	M.	61
	F.	40
Adults	M.	173
	F.	227.

5. Before accepting the figures for births it must be noted that still-births are *not* included. The Census Report of 1926, paragraph 109, states that still-births form 10.73 per cent. of the total births.

Again, the figures are taken from a book of Baptisms, which, although showing the date of birth of each child, does not show possible occasional live births in distant villages which result in death within the first or even second day of life before a baptism is possible in the church by a priest. Although the totals are probably incorrect for the above reason, the difference in the numbers of males and females permits of the statement that more female births occur.

6. Even allowing for the incompleteness of the record of adult deaths, it is obvious that there is a high mortality among infants.

7. In the age group 0—2 years and 2—5 years the mortality is higher among the females, whereas in the age group 5—15 years deaths among males exceed those among females.

8. As far as the figures for adults go, female deaths exceed male deaths.

9. In conjunction with paragraphs 83 to 91 of the Census Report of 1931 the above figures are of interest as they bear out certain deductions of the compiler upon infant mortality and deaths in relation to the sexes.

10. It is not known definitely what causes the high infantile mortality, but the primary cause is almost certainly malaria."

(ii) ASIATICS.

The Asiatic population is steadily decreasing and figures given for 1934 are 1,401 as compared with 1,474 in 1933 and 1,583 in 1932.

During the year there were 48 births and 16 deaths.

The causes of death were :—

	Males		Females	
	Adults	Infants	Adults	Infants
Broncho-pneumonia	—	1	—	—
Asthma	1	—	—	—
Chronic-nephritis	1	—	—	—
Tuberculosis	—	—	1	1
Malaria	3	1	—	—
Septicaemia	—	—	—	1
Myocarditis	1	—	—	1
Diarrhoea	—	—	—	1
Influenza	1	—	—	—
Pneumonia	2	—	—	—
	9	2	1	4

(iii) EUROPEANS, GENERAL POPULATION.

The European population for the year 1934 numbered 1,800, in 1931 the year of the last census the figure was 1,975.

During the year 40 births were recorded and 13 deaths, the causes of death were as follows :—

	Male		Female
	Adults	Infants	Adults
Gunshot wound	1	—	—
Cardiac failure following blackwater fever	2	—	2
Cerebral malaria	—	1	—
Uraemia ...	—	1	—
Arterio-sclerosis	1	—	—
Pneumonia	1	—	—
Angina pectoris	—	—	1
Malaria ...	—	—	1
Asphyxia by violence	—	—	1
Aortic stenosis	—	—	1
	5	2	6

(iv) EUROPEAN OFFICIALS.

During 1934, 125 European officials were on the sick list and off duty for an average of 13.66 days each, as compared with 105 officials off duty with an average of 17.2 days each in 1933.

There were 52 cases of malaria with a total loss of 304 days, 22 cases of influenza with a loss of 95 days, 15 cases of amoebic dysentery with a loss of 204 days and 9 cases of tonsillitis with a loss of 55 days. Seven officials were invalided.

The following table shows the sick, invaliding and death rates of the European officials :—

	1931	1932	1933	1934
Total number of officials resident	270	267	282	276
Average number resident	213	212	202.6	205.7
Total number on Sick List	114	95	105	125
Total number of days on Sick List	1,725	1,136	1,808	1,708
Average daily number on Sick List	4.7	3.1	4.9	4.68
Percentage of sick to average number resident	2.2	1.4	2.4	1.66
Average number of days on Sick List for each patient	15.1	11.9	17.2	13.66
Average sick time to each resident (days)	8.1	5.3	8.9	8.3
Total number invalided	5	3	10	7
Percentage invalided to total residents	1.8	1.1	3.47	2.53
Total deaths	1	2	2	—
Percentage of deaths to total residents	0.3	0.7	0.7	—

The causes of invaliding were :—

1. Amoebic dysentery.
2. Albuminuria.
3. Acute dyspepsia.
4. Chronic periostitis.
5. Arterio-sclerosis.
6. Injury to eye.
7. Chronic appendicitis.

(v) NATIVE OFFICIALS.

The Native officials numbered 1,987 in 1934, excluding the Native troops and casual labour in receipt of less than ten shillings a month.

Of this number, 721 were on the sick list and off duty for a total period of 6,309 days.

The prevailing disabilities and the days lost are compared below with those of the previous year.

	1933		1934	
	No. of cases	No. of days lost.	No. of cases	No. of days lost.
Malaria	58	325	102	488
Influenza	15	91	91	594
Injuries	42	523	66	656
Respiratory affections	53	744	53	207
Dysentery	16	201	27	301
Venereal diseases	20	464	28	703

Eleven deaths occurred as compared with 16 in 1933 and 11 in 1932.

The causes of death were :—

Enteric fever	1	Acute nephritis	1
Cirrhosis of liver	1	Concussion	1
Pulmonary tuberculosis	1	Ruptured spleen	1
Pneumonia	3	Myocarditis	1
Hernia	1		

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES OF NATIVE OFFICIALS.

	1931	1932	1933	1934
Total number of Native officials	1,714	1,848	1,979	1,987
Total number on Sick List	545	544	431	721
Total number of days on Sick List	5,817	5,135	6,336	6,309
Average daily number on Sick List	15.9	14.0	17.4	17.3
Percentage on Sick List	0.9	0.7	0.7	0.8
Average sick time to each patient (days)	10.6	9.4	14.7	8.75
Average sick time to each official (days)	3.3	2.7	3.2	3.17
Total number of deaths	8	11	16	11
Percentage of deaths amongst Native officials	0.4	0.59	0.81	0.5

(vi) NATIVE TROOPS.

KING'S AFRICAN RIFLES.

There were 229 admissions to hospital amongst the troops during the year as compared with 329 admissions in 1933, whilst the number of cases treated as out-patients was 1,533 as compared with 872 in the previous year.

There were no deaths during the year.

Average strength of the Battalion	251
Daily sick rate	3.75%
Average daily number of sick in hospital	9.42

SECTION III. HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

Financial conditions again made it impossible to increase either the European or African sanitation staff. One of the two European Sanitary Superintendents was invalided home during the year and as no relief is provided for, it was with extreme difficulty that even routine sanitary measures were carried out for a period of some weeks until a local candidate was appointed.

The sanitary problem presented by not only the larger townships, such as Zomba, but also the smaller stations such as Lilongwe and Port Herald is a very urgent and pressing one and the necessity for improvement and increased technical supervision has been brought home in the most forcible manner by investigations which have recently been made into the sanitary conditions obtaining in certain areas in this Protectorate.

It is no exaggeration to say that the conditions revealed by the reports are deplorable in every instance and unless remedial measures are taken at an early date such a state of affairs cannot fail to react unfavourably on the public health of the community.

Zomba itself, as evidenced by the Medical Entomologist's report furnished during the year on the breeding places of the domestic fly, was found to be insanitary in the extreme. The disposal of nightsoil and rubbish in the compounds of official residences, a system which had been in vogue for the past 30 years, had culminated in a permanent nuisance which constituted a very real danger to the unhappy inhabitants, fly borne disease had become endemic and it was evident that the most stringent measures were necessary and essential if a white population was to be maintained.

If sanitary conditions in Zomba may be said to be unsatisfactory, conditions in other parts are no better and the need for further technical assistance is very real.

Funds at the disposal of Town Councils and Sanitary Boards are, in the majority of cases totally inadequate to provide even the most primitive sanitary services. Sanitary staff is insufficient and Medical Officers with huge districts to look after have not the time to devote to that close supervision which is essential if sanitary arrangements, which are entirely in the hands of natives, are to function efficiently and satisfactorily.

To a large extent the remedy would appear to lie in the provision of further European technical personnel trained in sanitary science; more frequent inspection and supervision and further training of the native subordinate staff.

In the rural districts the solution of the problem of effective sanitation is even more difficult, for on one hand the need is greater and more vital, and on the other, both funds and staff are almost entirely lacking. In this connection a proposal which has recently been set out for the extension of the "welfare" teaching at the Jeanes School, would appear to hold out great promise. Native sanitary inspectors after receiving their technical training, could be sent to the Jeanes School for instruction in the several aspects of rural welfare work, and then would be of much greater practical value to the village communities in which their future work will lie. It would, however, be necessary to increase the establishment of Native sanitary inspectors so that a supply of natives trained in this way could be maintained until there is at least one in each district.

In all schools throughout Nyasaland hygiene is taught as a subject, but in how many instances is the instruction given in the school carried out outside it?

Perhaps more practical methods are required and if the mothers could be educated to the same extent as their children, much might be accomplished.

(I). Preventive Measures.

Malaria and Malaria Prevention.

Opportunities have been taken to investigate in various districts throughout the country the incidence of malaria in children.

In the Ntakataka district Dr. Watson examined at the Mission school 60 boys and 60 girls, and the following extract from his report is quoted:—

> "The boys examined, aged from eight to fifteen years were boarders at the Mission, while the girls, aged from five to fifteen years lived at home in the surrounding villages. The numbers found with palpable spleens were as follows; boys, 12, girls, 24.
>
> Although the spleen rate among the boys is only half that of the girls, it must be remembered the latter have a lower average age than the former by reason of the inclusion of children between five and eight years, thus increasing the chance of finding palpable spleens. Of 36 children under the age of five examined at random around the Mission, 31 had palpable spleens, so that despite the better housing and diet of the boys, the difference may be explained as one largely due to age. In view of the above figures one is not surprised to find that the haemoglobin percentage of the boys is higher than that of the girls. What part, if any, the factor of sex contributes to this difference I unable to say.
>
> The average percentage of haemoglobin was found to be, boys = 74.1% — girls = 66.8%".

Anti-malarial measures such as oiling mosquito breeding places, training and canalizing streams, draining small swamps, tree planting, etc., were carried out under the direct supervision of the European Sanitary Superintendents in the larger townships.

In the smaller stations especially along the Lake shore and on the Shire River, official houses are partially mosquito proofed only and so far as is known no Government house has been built which is properly and efficiently gauzed and rendered proof against mosquitoes.

Epidemic Diseases.

Smallpox. The decrease in the number of cases of smallpox reported during the year was most marked and 814 cases with 25 deaths occurred as compared with 3,412 cases with 96 deaths in 1933.

From the commencement of the epidemic in 1930 until the end of 1934 a total of 20,508 cases with 751 deaths has been reported.

One of the principal districts to be affected was the Mlanje district which marches with the Portuguese border, a total of 384 cases with 3 deaths was reported for 1934.

The control of the disease in this district is especially difficult as a large quantity of alien labour crosses the border from Portuguese territory where the disease is endemic, looking for work on the tea plantations of Mlanje; as some indication of the numbers dealt with, from November 1st to the end of the year, 2,410 alien natives were vaccinated as they entered this territory.

Fortunately there are two main routes of entry in this district for alien labour into Nyasaland and two posts were established on these routes. At each post, one vaccinator and two smallpox guards were stationed; in addition, another vaccinator was quartered on the main road from Portuguese Mlanje.

All employers of labour were circularised and their co-operation was solicited to ensure that all labour engaged was or had been vaccinated, special vaccinators were licensed and in many cases engaged by local companies. The decrease in the number of cases since the adoption of these measures has been most satisfactory.

The following table shows the number of vaccinations carried out during the year:—

Station.	Successful.	Modified.	Unsuccessful.	Not seen.	Total.
Blantyre	3,038	1,934	1,268	236	6,476
Chikwawa & Neno	9,152	3,833	2,150	488	15,623
Chinteche	1,509	1,183	1,083	952	4,727
Chiradzulu	11,028	4,285	3,345	1,596	20,254
Cholo	13,646	9,714	664	—	24,024
Dedza	3,604	2,132	1,478	477	7,691
Dowa	5,379	3,386	2,309	305	11,379
Fort Johnston	8,183	5,396	856	1,829	16,264
Fort Manning	6,674	6,681	2,575	—	15,930
Karonga	4,146	517	613	391	5,667
Kasungu	1,462	556	406	502	2,926
Kota Kota	3,716	3,081	2,000	1,700	10,497
Lilongwe	12,090	2,738	1,294	—	16,122
Liwonde	7,215	2,203	1,554	832	11,804
Mlanje	22,747	12,165	7,916	10,931	53,759
Mzimba	5,918	3,633	2,886	713	13,150
Ncheu	5,440	919	1,150	642	8,151
Port Herald	14,994	5,659	3,327	1,400	25,380
Zomba	6,909	1,099	662	1,709	10,379
Total	146,850	71,114	37,536	24,703	280,203

Undulant Fever. Two cases of undulant fever were reported during the year for the first time in this Protectorate. The duration of the illness was 27 days in one case and 40 days in the other. The latter case was admitted twice to hospital as a slight relapse occurred.

Both cases occurred in Europeans and the diagnosis was confirmed by agglutination tests in each case, no splenic enlargement occurred and the pyrexia was of an atypical type.

The herds from which the milk supply was obtained were examined by the Veterinary Department with a negative result.

No known case of contagious abortion in cattle has occurred in the Protectorate and no cattle or goats have been found to be carriers of *Micrococcus militensis.*

Helminthic Diseases.

Ankylostomiasis. It is interesting to note that in Zomba out of 1,494 admissions to the Native Hospital, 140 were admitted on account of ankylostomiasis, while 47.2 per cent. of all other cases were found positive for hookworm by routine stool examination.

A large proportion of the population infected with hookworm acts as carriers and complains of no symptoms, statistics obtained from other hospitals bear this out, for example, at the Cholo Hospital 1,939 stools were examined and hookworm was found in 62 per cent., still more remarkable were the findings obtained in the examination of the population of a small village in the Kuweraza district (Cholo) where of 375 stools examined 100 per cent., were positive for ankylostomiasis, and it is interesting to note that in this instance the average haemoglobin index was 67.6 per cent. (Tallquist's scale).

Again at Fort Johnston of 736 faeces examined, 649 contained hookworm eggs. Only a very few of the individuals whose stools were examined complained of any symptoms suggestive of the disease. The hospital records show that 88 per cent. of the natives attending hospital are infected with ankylostomes.

At Karonga an attempt was made some 3—4 years ago to treat the population of a certain section of the district 'en masse' for hookworm disease, unfortunately through change of Medical Officers and lack of staff a continuous series of statistics has not been kept.

No attempts were made during the year to carry out any mass treatment campaign. It is anticipated, however, that during next year, mass treatment together with prevention methods, latrines, propaganda, etc. will be instituted in one or two areas on the Lake shore. The incidence of the disease varies throughout the Protectorate and Watson considers that the drainage factor plays a most important part in controlling the incidence of hookworm infestation; generally speaking statistics bear this contention out, for example, the mountainous regions of Zomba and Mlanje with rainfalls of some 60 and 80 inches respectively and good drainage show an incidence of hookworm varying from 22.2 per cent. to 28.3 per cent. as compared with the low lying districts, such as Port Herald and Karonga with rainfalls of 30 to 50 inches and poor drainage which show an incidence of 53 per cent. and 64 per cent. respectively.

Schistosomiasis. 4,996 cases were treated as compared with 5,031 cases for 1933.

Dye during his investigations into this disease in Northern Nyasaland came to the conclusion that a heavy mortality among the children occurred from the intestinal form of infection, death being due to cirrhosis of the liver.

Young children usually get infected by defaecating in small muddy pools which harbour in great quantities the mollusc host, the incidence of the disease varying throughout the country, being of course highest where the natural features favour the development of the helminth and the spread of infection.

In an examination in the Mlanje district of some 340 unselected natives, *Schistosoma haematobium* was found in 25 per cent.

In the Fort Johnston district the incidence based on the routine examination of the urines of all hospital patients and upon unselected natives in the district was found to be in the neighbourhood of 37 per cent.

In the Cholo district an examination of the urines of 217 unselected native showed that 22 per cent. of children were infected and 50 per cent. of the adults.

Helminthic infections may be said, therefore, to be responsible to a considerable extent for the ill health of the native population—such diseases are preventable and efforts are being made by constant propaganda, both on the part of the Medical Officers and their native assistants to educate the native into the use of latrines and to control the promiscuous defaecation in bathing places and pools. Attention is being paid to the provision of better water supplies and natives are encouraged to bathe in snail free bathing pools.

(II) General Measures of Sanitation.

In Zomba efforts were made to complete the scheme for the installation of a water carriage sewage system as rapidly as possible and by the end of the year 28 septic tanks were in use and 19 others were under construction.

Disposal of night-soil and refuse was placed on a more hygienic basis, and I am glad to say that before the end of the year the old system of disposal by burying in the compounds of the residential quarters was completely abandoned and for the disposal of the night-soil a system of deep pits with fly proofed covers was introduced. Each pit served a group of houses and public latrines, the buckets from these premises being emptied into the pits; each bucket before being emptied was sprayed with disinfectant.

With regard to the rubbish, small hand carts with covered tops were procured and all rubbish throughout the township is now collected and disposed of by incineration.

Fly breeding places under the old system were found to be numerous and even by taking the greatest precautions it is impossible in a scattered area such as Zomba to eradicate the native habit of promiscuous defaecation in any spot presenting the slightest cover or concealment. Tropical growth is prolific and great difficulty is experienced in keeping even a part of the township area clean.

A further problem which had to be tackled arose from the numbers of women and children (wives and children of personal servants) residing in the compounds of official and private residences over whom sanitary control is practically impossible and as it has been shown that the children are particularly dangerous on account of being carriers of malaria and that both children and adults are to a considerable extent parasitized by helminthic and protozoan infections, the danger therefore of Europeans living in such close proximity to natives is a very real one.

A commencement has been made, therefore, with the erection of a temporary native location to house all private employees in an area remote from European residences and it is the aim and object of the Town Council to provide ultimately, a location built with permanent materials as soon as the necessary funds for capital expenditure can be obtained.

To carry out sanitary and health measures in a town such as Zomba, scattered and built for the main part on the steep slopes of a mountain, is a peculiarly difficult and expensive problem but not incapable of solution. Comparatively large sums have already been expended on sanitary measures and applications have been submitted to the Colonial Development Advisory Committee for further funds to complete the installation of septic tanks for residences and for public purposes. Further funds will be required for a permanent native location and other minor public health measures before Zomba can be placed in the category of a more or less satisfactory and hygienic township.

Reports from some of the tobacco buying stations have been received and indicate that the provision of public latrines and sanitary personnel has effected considerable improvement in the condition of these stations.

The sanitary condition of certain townships in the Protectorate is still far from satisfactory. Such a state of affairs is, it is considered, due to the lack of adequate supervision and the lack of technical staff, as the establishment of the Medical Department provides for only two European Sanitary Superintendents who are employed entirely in the Townships of Zomba, Blantyre and Limbe.

The provision of at least one other European Sanitary Superintendent is a measure of considerable practical and economic importance.

Short extracts from the Reports of the Sanitary Superintendents of Zomba, Blantyre and Limbe are appended.

A. ZOMBA.

(I) Latrine and Night-Soil Disposal.

A wholesome improvement marked the year 1934 by the construction of 28 water closets (septic tank system), and the inauguration of a sanitary service for night-soil collection and disposal.

During October, fifteen deep pits varying in depth from twenty to thirty feet were dug and covered by concrete slabs with an opening over which cage fly traps were placed. Buckets from the public latrines were collected twice daily and from all dwellings in the township, (with the exception of those equipped with septic tanks) once daily, early in the morning, and the contents emptied into the pits. While not the ideal method of dealing with night-soil nevertheless this deep pit burial system is proving quite successful. All buckets are washed and disinfectant placed in them before use.

The present public latrines are a source of continual nuisance due to faulty design and bad construction.

Limewashing of latrines is carried out periodically.

Promiscuous defaecation is rampant in the area behind the stores on the south side of Broadway and this area should be used only for ground crops.

(II) Refuse Removal.

A vast improvement was made toward the end of the year by the introduction of a refuse removal service. Five dust carts, each drawn by two labourers, were employed in collecting the refuse and taking it to an incinerator where it was burnt. This service is working very satisfactorily and eliminates the long standing nuisance of shallow burial which afforded such excellent fly breeding grounds.

(III) Flies.

Nuisance by flies has been associated with Zomba for many years, this has chiefly been due to:—

1. Shallow burial of house refuse affording breeding places.
2. Shallow burial of night-soil.
3. Promiscuous surface defaecation.
4. Insanitary latrines (particularly those of Asiatics).
5. Daily importation of flies on the backs of natives (a conservative count during December gave the number for the month as 100,000).
6. The large number of fruit trees both cultivated and indigenous, whose rotting fruit provide breeding places.

An intensive campaign against fly breeding was conducted during the latter part of the year. The measures used included:—

1. Organization of refuse removal service.
2. Organization of night-soil disposal service.
3. Destruction of flies by poison.
4. Spraying, tamping, filling in or removing of fly breeding places.

Over two hundred fly breeding areas were dealt with and a decrease in the fly population was noticeable.

The only practical method of dealing with the daily importation of flies is to have an effective sanitation system, particularly in regard to refuse disposal (incineration preferably) and night-soil disposal in the large populated areas surrounding the township. While 1934 has seen excellent progress in the right direction, it must be recognized that in order to deal successfully with the problem, a belt of territory at present outside of Zomba Township, but adjacent to it and thickly populated largely by Zomba employees, should be subject to as stringent regulations and supervision as Zomba proper.

(IV) CONCLUSION.

1. There is no question but that with the continuance of the sanitary measures in use during the latter part of 1934 Zomba will become definitely more healthy, subject to fewer water, food and fly-borne diseases.

2. With adequate financial resources and intelligent and active supervision Zomba should become entirely free from mosquitoes and comparatively free from flies.

B. BLANTYRE.

(I) NATIVE HOUSING.

The lease of the native location at Naperi was delivered to the Council towards the end of the year.

The Blantyre Town Council gave instructions to mark out plots for 200 houses and sanctioned the erection of 30.

The work is to be continued as soon as the rains abate.

(II) INDIAN PREMISES.

The Indian premises consist as a rule merely of a store; many of the assistants sleep in the stores, as there is no other accommodation.

The condition of the Indian area leaves much to be desired.

(III) WATER SUPPLY.

Water is taken from the upper reaches of the Mudi River and tributary streams.

The water is carried by gravitation to all occupied premises, with three exceptions.

The raw water passes through a battery of four mechanical filters having been first treated with Alumina-Ferric.

After filtration, lime is added and the water passed to a clear water tank forming a reserve of 120,000 gallons.

During the early part of the year the new dam was completed. The dam is 1,400 feet long and 24 feet deep, and approximately 12,000,000 gallons of water were impounded.

During the dry season 78,000 gallons of water per day were used in the town.

In September an objectionable smell and taste was noticed; investigation proved this to be due to decaying vegetable matter and to Algae.

Calcium Chlorinata, used in the form of a paste, was put into the water about sun-down; in addition lime was scattered over the surface of the water. The objectionable smell and taste disappeared in the course of a fortnight.

Six subsidiary dams were constructed across two tributary streams with a view to helping sedimentation and to stop the wash of silt into the main dam. At the end of the year these small dams were impounding several millions of gallons of water.

A further dam is contemplated on the Blantyre side of the main dam, and if this work is carried out it is estimated a further 28 million gallons of water will be impounded.

In the higher regions of the town, water was not available during the morning and early part of the evening.

It was believed that the mains were not adequate to carry the volume of water.

In 1935 it is expected that the 4 inch mains will be replaced by 6 inch mains and the 4 inch pipes will be used to form a high pressure ring round the town. If this work is carried out. the water supply of Blantyre should be adequate for several years to come.

(IV) ANTI-MOSQUITO WORK.

Regular inspections were made throughout the town. When mosquitoes were found breeding on occupied domestic premises, notices were served.

Sanitary Gangs were employed in cutting rank vegetation throughout the town.

Stagnant water was sprayed with Anti-Malarial Oil or Paris Green.

The drain in the location of the Medical Department was made up in permenent materials.

Several small wash-aways occurred in the hospital drain, some of these were due to brickwork perishing and others to subsoil water. The work will be repaired as funds permit.

If Blantyre is to be cleared of mosquitoes, many thousands of pounds will be necessary. The Naperi stream provides the main breeding ground for anopheline mosquitoes and as the water is known to rise over 20 feet during storms, canalization appears to be out of the question.

The administration of the town has been responsible for the formation of many mosquito breeding places by lack of attention to the matter of road side drainage. In some cases the road drains discharge into natural gulleys or 'dambos' and the rush of water has made these places into formidable rivers during the rains, and ideal mosquito breeding places during the dry spells.

(V) FOOD INSPECTION.

Regular visits were paid to all food stores and the native market.

867 tins of food, 680 lbs. of meat and 1,320 fish were seized and destroyed.

A register of milk vendors was compiled, but no practical methods have been instituted for inspection of cattle, milking sheds, or yet to test cleanliness of the supply.

C. LIMBE.

(I) HOUSING.

European Houses. There were 43 European houses in the town. One of these houses was mosquito proofed. No new houses were built during the year.

Indian Housing. There is an Indian housing estate situated at the South West of the town, consisting of 26 houses. The houses are constructed of brick with iron roofs. These houses are in a reasonable sanitary condition. A number of Indians who are employed as store assistants sleep in the stores and up to the present the Town Council have not deemed it advisable to take any action.

(II) NATIVE LOCATION.

The native location was extended and 86 houses were occupied at the end of the year. The Town Council employees are still housed in temporary quarters. No attempt has been made to erect a better type of house.

Many of the houses built by the natives were well constructed and well kept. The location of The Nyasaland Railways was in a most unsatisfactory condition and the Company stated that plans were under consideration for the reconstruction of the location.

There are many European, Indian, and Native houses all round the boundaries of the town and the majority of these premises should be taken into the township by extention of its boundaries.

(III) NIGHT-SOIL REMOVAL.

Night-soil was removed during the early hours of the morning by motor lorry. The used bucket was taken away and a clean washed bucket was placed in the latrine. The night-soil was disposed of in trenches previously prepared, in the Town Council's trenching ground.

All latrine buckets were painted with bitumastic paint.

(IV) REFUSE COLLECTION AND DISPOSAL.

Portable dustbins which are the property of the Council are hired out to all householders. Refuse was collected daily by motor lorry and the refuse was used for the purpose of filling up disused borrow pits. All refuse was regularly covered with soil. The destructor was used during the rains owing to the fact that flies were found to be breeding in the wet refuse.

(V) WATER SUPPLY.

Water was taken from boreholes in various parts of the town. Seven of these boreholes are the property of the Town Council.

The Nyasaland Railways and the Limbe Hotel each have their own borehole. The Imperial Tobacco Campany has its own supply of water; analysis showed that the water was suitable for all domestic purposes.

(VI) ANTI-MALARIAL WORKS.

Regular inspections were made in the town and where mosquito larvae were found on domestic premises, notices were served. It was not necessary to take legal action. The second main drain in the native location was made up in stone and cement for a distance of 168 yards.

It was not possible to carry on with the canalization of the Limbe stream owing to heavy rain in June. The deep drains in James' Street were made up in stone and cement and carried to the Limbe stream.

Long grass and rank vegetation were cut regularly in all parts of the town.

(VII) GENERAL SANITATION.

Daily inspections were made throughout the town for the detection and abatement of nuisances. One set of premises was demolished after the expiration of a sanitary notice.

One hundred and eight notices were served for the abatement of minor nuisances, such as choked drains or insanitary premises. A strong recommendation was put to the Council to construct a "sanitary lane" between High Street and Livingstone Avenue. Though the proposition has been talked over for the last three years nothing had been done by the end of the year.

Insanitary conditions prevail in this area owing to the fact that two main frontage roads were permitted and no means of drainage or access was provided to the residential and domestic parts of each premises.

(VIII) LUNZU.

Lunzu, a small trading centre at mile 12 on the Matope Road was declared a Sanitary Area three years ago. Sanitary labour was employed for the purpose of cutting grass, cleaning the market and other public works.

There are 12 Indian stores built of brick and these stores are in a reasonable sanitary condition. There are pit latrines for each of the occupied premises and two blocks of public pit latrines.

During the year a brick meat market was erected. A well was constructed by the Geological Department and it is the intention of the Sanitary Board to supply a pump.

A humane killer was provided for the slaughter of animals. A small slaughter house is urgently needed and will be considered by the Board when funds permit.

A definite native location should also be considered in the near future.

(IX) SMALLPOX.

Four thousand nine hundred and thirteen vaccinations were carried out by the Departmental staff in addition to these shown in the reports of the native vaccinators.

(X) NATIVE VACCINATORS.

Two native vaccinators are employed in Blantyre district whilst the Sanitary Superintendent and three native sanitary inspectors are also licensed vaccinators.

The native vaccinators work from village to village through the district and at the end of each month they submit figures, the veracity of which cannot be vouched for.

Each vaccinator may be supplied with as many as 12 tubes of lymph per month, usually the number is considerably less. This shows that apart from travelling, a native vaccinator does not do one hour's work per day throughout the month.

When an outbreak of disease is reported, a vaccinator is sent or taken to the area. A hut is built outside the village and so far as possible the patient is isolated. The native vaccinator is responsible for vaccinating the immediate district.

If a second outbreak is reported, the District Commissioner is asked to call up all the inhabitants of the district within a radius of 3 to 5 miles.

Where this course was adopted the Medical Officer, Sanitary Superintendent and three native sanitary inspectors proceeded to the meeting place and vaccinated all natives who had not been previously and recently vaccinated. In this way, as many as three thousand vaccinations have been done in one day.

(III). School Hygiene.

There are two European schools in the country, one, a boarding and day school at Limbe, and, the other, a day school at Blantyre.

Both these schools were inspected by the Senior Medical Officer, Blantyre during the year.

On the whole the general health and condition of the school children was excellent.

The ages of the children varied from 5 to 13 years and 19 boys and 33 girls were examined, certain results are appended :—

	Good	Fair	Requiring treatment
Teeth	34	11	7
	Normal	Enlarged	Removed
Tonsils	47	3	2

Details of ages, heights and weights are kept, but the small number of children involved does not permit of comparisons being made.

With regard to native schools it was not found possible to carry out any school medical inspections except at the Ntakataka Mission School and at the Jeanes School near Zomba.

It is anticipated that with the provision of increased funds for transport it will be possible for Medical Officers to carry out a medical survey of at least one native school in their districts during the forthcoming year. The value of such medical inspections if only from an economic point of view cannot be assessed too highly.

It cannot be doubted that the improvement of the environment and social conditions, the treatment and prevention of the endemic diseases from which the children suffer, and instruction in the principles of hygiene must result in the better development, both physically and mentally, of not only the African of school age but also of the adult.

Some interesting extracts from the reports of the investigations carried ont by Dr. W. H. Watson at Ntakataka and by Dr. L. C. Mayne at the Jeanes School near Zomba are included below :—

Dr. Watson writes :—

> "It may safely be said that whatever produces this high mortality in infants is likely to produce ill health and weakness in the survivors.

A medical survey of the survivors in the Ntakataka Mission school bears out this contention.

The boys examined, aged from eight to fifteen years were boarders at the Mission, while the girls, aged from five to fifteen years lived at home in the surrounding villages.

Two simple smears of each stool were examined in every case and the usual centrifuged specimens of urine were examined for ova of *S. haematobium.*

	Boys	Girls	Adult
Number examined	60	60	31*
No. with hookworm	15	17	21
,, ,, hookworm and *S. mansoni*	9	26	1
,, ,, hookworm and ascaris	2	0	0
,, ,, hookworm, *S. mansoni* and ascaris	0	1	0
,, .. *S. mansoni*	6	10	1
,, ,, *S. mansoni* and ascaris	1	0	0
,, ,, ascaris	1	1	0
,, ,, *S. haematobium* (The urines were not examined on the same date as the stools)	42	48	not done
Total positive to intestinal group	34	55	23
Total positive to hookworm	26	44	22
,, ,, ,, *S. mansoni*	16	37	1
Average percentage of haemoglobin	74.1%	66.8%	67.0%
No. with palpable spleens	12	24	2
,, ,, scabies	38	2	1
,, ,, tinea	2	0	0
,, ,, caries, one tooth bad	12	3	7
two teeth bad	3	5	4
three ,, ,,	4	2	1
four ,, ,,	1	1	1
five ,, ,,	0	0	1
six ,, ,,	0	0	1
seven ,, ,,	0	1	1
,, ,, pyorrhoea	2	1	4
,, ,, leprosy	0	1	0
,, ,, disease of lung (clinical tuberculosis)	0	0	1
,, ,, disease of heart (aortic regurgitation)	0	0	1

* Male 18, Female 13.

The higher incidence of helminthic infestation in the girls is very marked. Two things help to explain the lower incidence in the boys, (a), as boarders the boys use pit latrines and (b), when they do use the bush, like most boys they are not over modest and possibly escape entering densely screened places which are well used and therefore highly infested with hookworm larvae. Thus hookworm infestation is minimised. The second reason is the only obvious physical one to account for the lower numbers of schistosomiasis among the boys. They wash and bathe openly in a part of a stream well clear of reeds where the district road crosses, whereas the girls shun the crossing and seek seclusion in small areas well screened with reeds. For this reason the chance of infestation is greater for the girls.

Although the spleen rate among the boys is only half that of the girls, it must be remembered that the latter have a lower average age than the former by reason of the inclusion of children between five and eight years, thus increasing the chances of finding palpable spleens. Of thirty six children under the age of five examined at random round the mission, thirty one had palpable spleens. So that despite the better housing and diet of the boys, the difference may be explained as one largely due to age.

In view of the above figures, one is not surprised to find that the haemoglobin percentage of the boys is higher than that of the girls. What part, if any, the factor of sex contributes to this difference I am unable to say.

The higher incidence of scabies among the boys is noteworthy. The dormitary system is the most likely cause. The boys huddle up together in the cold weather for warmth, and, until they start taking an interest in their personal appearance at puberty, they shun cold water and appear happiest when dirty. It is distinctly noticeable that the girls are cleaner and take more pride in their personal appearance. They are overpoweringly modest even at the age of ten although fourteen or fifteen is the usual age at which menstruation appears. It is perhaps worth noting that a case was met with of a healthy intelligent girl of eighteen who had not yet menstruated.

Age again is a possible factor in explaining the higher figures for caries among the boys although carelessness about cleaning the teeth was marked in comparison with the girls.

While making these examinations it was apparent how physical examination frequently bore out the remarks of the Sisters about one or other of the children being "not strong, weakly, or always off school with fever". They are seldom acutely ill, but are listless, cannot concentrate and are unable to attend school for a few days every other month. These opinions of the Sisters are in accordance with native hospital experience, in which acute malaria is almost always found in infants.

Difficulty was experienced at first while trying to induce adults to come up for examination because the population in this area is unaccustomed to European doctors. I was surprised to find a school teacher who was ignorant of the fact that I knew midwifery and would attend any woman in difficult labour. After the school children had been treated, however, the adults became interested and thirty one were examined before I left.

The decrease in infestation with *S. mansoni* among adults is striking. It is unfortunate that I failed to complete the work by examining the urine for ova of *S. haematobium*, but in hospital practice infestation with the latter is rare in adults. Schistosomiasis in this country in my opinion, is definitely a disease of childhood and adolescence, and further, appears to cause no serious ill health except in massive infestation and possibly in highly susceptible individuals. My experience of this part of the lake shore is insufficient to compare it with the Karonga lake shore, but I did not meet with any cases of splenomegaly with liver enlargement such as is present in Karonga and due to infestation with *S. mansoni*. I expect such cases would be found if sought for.

The much lower spleen rate and the higher numbers of cases of dental caries and pyorrhoea is what one expects in adults. It is perhaps unusual that a case of organic heart disease and one of tuberculosis of the lungs should appear in such a small number of people examined, but doubtless the adults who came up for examination were not disinterested entirely, and therefore hardly a true sample of the state of health of the adult population.

It is impossible to suggest any comprehensive scheme of improvement applicable to the general population without the expenditure of large sums of money. Hookworm campaigns are definitely within the realms of modest spending, and, as is shown by these figures, hookworm infestation is the only debilitating disease which is common to adults and children and sufficiently marked to demand mass treatment.

A great deal more could be done by simple means to improve the health of school children, at least in central schools under European teachers. Boys in such schools are important people, as they are the future chiefs, teachers and headmen, and any change which would improve their health would reflect at once on their mental ability and at the same time be useful propaganda. The simplest method would be medical examination on admission to school by a medical practitioner, wherever possible. If not possible, I do not think that palpation for an enlarged spleen or estimation of the haemoglobin by Tallquist's scale is beyond the powers of an interested missionary or nurse. At any rate, simple regular weighing is possibly as useful an indicator of health in a child as any more advanced method, and quarterly weighing of the pupils would be an improvement upon the present haphazard way of waiting until ill health is complained of. Any drop in the weight or a stationary weight over two weighings would demand investigation, and, if this were beyond the powers of the missionary or nurse, such cases could be notified to the Medical Officer.

On transfer to a central school all children could be treated with carbon tetrachloride and oil of chenopodium and any cases of haematuria could be investigated and treated at a hospital. Instead of the indiscriminate dosing of pupils with quinine, when headache or fever is complained of, regular weekly doses of quinine could be given to pupils with enlarged spleens. Smaller doses of quinine than are usually given to Europeans to cure an attack apparently work well with natives, owing to their development of a relative immunity, and a trial might be made of giving 5 to 10 grs. Saturday and Sunday according to the age of the pupil.

It is essential that the medical forces of the country should be utilised in the work of education, and it should not be necessary to point out that children in school deserve greater attention than prisoners in prisons. Also, there is too great a lag between our knowledge of existing ill health and our performance in treating it, not to speak of preventing it. With so few medical officers per head of population, the purely clinical side of medicine must suffer in favour of organised methods of investigation and treatment, if we are to make any impression upon the appalling ill health of the population".*

IV. Labour Conditions.

The construction of the Lower Zambesi bridge was practically completed by the end of the year and it is anticipated that the numbers of Nyasaland natives employed will diminish during 1935.

Generally speaking labour conditions at the bridge have been very satisfactory and the health of the natives has been on the whole remarkably good. No epidemics have occurred during the year.

The general welfare of the Nyasaland natives employed was safeguarded by the monthly inspections paid to the bridge by the Medical Officer at Port Herald.

Accident cases account for the majority of admissions to hospital, an average of approximately 15 cases of dysentery occurred each month out of a total average population of some 4,000.

It is a curious fact that while malaria is the most prevalent disease amongst Europeans and Asiatics, not a single case of this disease was reported amongst the African hospital admissions.

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*The Medical Department is deeply indebted to the Rev. Father Braire of Ntakataka Mission for his kind permission to use his registers and for his help in the work. Our thanks are also due to the Sisters for their co-operation.

The preliminary investigations made by Dr. Mayne at the Jeanes School are incorporated in the section dealing with Medical Surveys on page 40.

Planters who maintain dispensaries and staff for the treatment of their labour are assisted by Government by being allowed to purchase from the Medical Department certain drugs and dressings at cost price.

It is proposed during 1935, if staff is available, to investigate conditions of labour on estates throughout the Protectorate.

V. Housing and Town Planning.

The housing problem for Africans in Zomba is one of major importance owing to the increased incidence of amoebic dysentery. Carriers of this disease have been found to exist not only amongst personal servants but also amongst the prison population. In an examination of 486 stools of Africans living in Zomba in 1933, 3.5 per cent. were found to be infected with *E. histolytica.*

Moreover, a large native population lives in the compounds of European residences, a considerable proportion of these compounds abut on the well forested slopes of the mountain and consequently ample cover is provided for promiscuous defæcation, the women and children are especially difficult to control from a sanitary point of view. Native employees of Government with their families are also housed in wattle and mud buildings in the midst of the European population.

It is therefore very important in the interests of public health to prohibit all women and children from residing in the European areas.

The need for the provision of a model location constructed upon hygienic and sanitary lines and provided with all modern conveniences is very apparent. Such a location should serve as a demonstration to the natives of the advantages to be obtained by living under really healthy conditions.

The problem has to a certain extent been tackled in Zomba, Limbe and Blantyre where a commencement of a scheme of housing has been made by the establishment of temporary locations.

Lack of funds has proved the stumbling block in the development of adequate housing facilities.

In the rural areas every opportunity is seized to impress on the native the advantages of clean, well built and well ventilated houses; native dispensers are instructed to tour the villages in the vicinity of their dispensaries to advise and assist in sanitary measures. Jeanes School Supervisers are proving more than useful and new villages have been constructed along hygienic and sanitary lines. Co-operation between the Medical Department and the Education Department is maintained to the fullest extent.

VI. Food in relation to Health and Disease.

In the larger townships meat and food inspection is regularly carried out and suitable markets have been provided.

Some of the smaller trading centres have been declared Sanitary Areas and have been able to instal latrines, small markets and other facilities to the great advantage of the local traders. It has been found that the tradespeople, both Asiatic and Native, under the guidance of a keen administration, have taken great interest in their own affairs and in the hygienic improvement of their area.

Particular attention has been paid during the year to the question of hospital dietaries and steps have been taken to ensure that each hospital is provided with a suitable and adequate diet. Meat or fish now form an essential part of the patients food and by this means it is anticipated that some slight stimulus will be given for the regular slaughter of cattle and sheep.

The Medical Officer Fort Johnston in discussing the incidence of the general systemic diseases, writes as follows:—

> "The commonest disorders in this group are constipation and bronchial catarrh.
>
> There is no reasonable explanation for the number of cases of the former condition.
>
> Natives rarely suffer from any other systemic affections of the alimentary canal.
>
> Bronchial catarrh, however, as I mentioned in my Annual Report for 1933, is thought to be associated, especially in children, with defective nutrition.
>
> In this district, native diet is thought to be deficient in vitamin C.
>
> Rohmer et al. (Bull. de e' Acad. de Med. 1934) point out that after the first six months, the power of an infant to synthetise the provitamin C in human milk begins to fail and that from that time onward a generous supply of formed vitamin C is an essential part of the diet. Hess. (New Eng. Jour. Med.) suggested that susceptibility to infection, especially respiratory, is increased by the absence or deficiency of vitamin C.
>
> Children admitted to hospital with catarrhal conditions have been cured by the addition of tomatoes to their diet and during the forthcoming year it is proposed to investigate the seasonal incidence of catarrh and to find out if this corresponds with the time of the year when little vitamin C is available."

B. MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

During the year Medical Officers were encouraged, as far as the limited funds for travelling allowed, to visit their districts and to gain first hand knowledge of the conditions obtaining in rural areas. Much useful information has been obtained by these means, definite statistics relating to the incidence of disease are now available for certain localities and Medical Officers have been able to demonstrate to natives totally unacquainted with the practice of European medicine the value of such methods of treatment. By suitable propaganda natives are being persuaded that attendance at hospitals and dispensaries for treatment of their ailments is to their benefit.

Members of the Department are expected, as opportunity occurs, to preach the gospel of Hygiene and Sanitation and on such an occasion it is the exception to find any but an interested and attentive audience.

As examples of what is being attempted I quote the following extracts from Annual Reports of Medical Officers :—

(I) Fort Johnston.

> "During the months of June and July, Principal Headmen Katuli and Mponda each sent two men to be instructed in simple sanitation. These men received no pay but were lodged in the hospital.
>
> They were told of the transmission of malaria and of the need for the proper disposal of excreta. Sanitary work was demonstrated to them by the sanitary gang.
>
> When lakeside villages were visited in August of this year lectures on sanitation were given to Chiefs and Headmen.
>
> At the suggestion of the Director, Chiefs visiting the Boma were conducted round the hospital, when the working of it was explained to them. They have now formed the habit of coming periodically to see patients whom they themselves have sent in ".

(II) Cholo.

> "Regular lectures on hygiene are given to all hospital staff and to the rural dispensers once a month. Rural dispensers are required to visit all villages in the vicinity of their dispensary and to endeavour to see that huts and surroundings are kept clean. They are required to keep a record of all births and deaths in their area.
>
> They are required to hold 'first aid' classes for headmen and others interested ".

(III) Karonga.

> "Whilst on 'ulendo', at every village where a halt was called the headmen and villagers were lectured on Hygiene.
>
> A similar lecture was given to all headmen when they came to Karonga.
>
> Separate talks have been conducted with Chief Chungu on the same subject, in an endeavour to arouse some interest.
>
> Plans for the lay-out of houses and quarters have been given to several headmen. They have been advised as to the disposal of their faeces, refuse and cow dung, how to plant trees to act as wind breaks, how to conserve and purify their water supplies and to protect their harvest produce from rats.
>
> The vaccinators and dispensers have also been taught to impress upon headmen the necessity for cleanliness of the person, house and village.
>
> On my second 'ulendo' in the hill country it was gratifying to see improvement taking place at the two villages where there are rural dispensaries and at other villages visited only by vaccinators.
>
> The best villages in the district, are undoubtedly those where there is an ex-Jeanes School teacher as headman."

(IV) Mlanje.

> Special sanitation work.
>
> "In August at the request of Principal Headman Mabuka, a new site for a village was chosen, and its lay-out based on that of the model village at the Jeanes School.
>
> At both village surveys the opportunity was taken of impressing upon villagers the dangers of unhygienic living.
>
> They were told how helminthic infections were passed one to the other and that their only hope of being completely freed from these diseases was *not* the continual taking of medicine *but* the continual use of properly constructed latrines.
>
> Their water supply was inspected and suitable bathing and washing places indicated to them.
>
> The necessity for boiling drinking water and the dangers associated with the pernicious practice of feeding nurslings on maize cobs, green mangoes and other indigestible food were pointed out."

C. TRAINING OF AFRICAN PERSONNEL OF THE MEDICAL DEPARTMENT.

I. DEPARTMENTAL.

(*a*) Medical.

Apart from the training of hospital dispensers carried out by individual Medical Officers at Native Hospitals, no organized training is afforded by the Department.

It is considered, however, that there is urgent need for the provision of some organized system of training for the African personnel working in hospitals and rural dispensaries.

Throughout the country, the professional standard of the dispensers or dressers employed at both hospitals and dispensaries is very low.

The majority of the present African staff are either too poorly educated or too old to improve and consequently act as a drag upon any departmental progress it may be possible to make.

Towards the end of the year an effort was made at the Native Hospital, Zomba, to raise the standard of nursing by trying to attract a better type of native into the Department and all probationers were required to have passed at least standard IV at school and to be able to read and write English and do simple arithmetic.

Regular classes are now being held by the Medical Officer and cards are issued containing a full list of the various nursing and ward duties to be performed. These cards are signed up by the European sister in charge and ensure that each dresser or dispenser is proficient in each of the subjects laid down.

One drawback to the scheme is the lack of teaching staff, it can hardly be expected that one Medical Officer with the charge of 100 beds will be able to devote sufficient time to teaching.

The need for further staff is very urgent if the scope of this elementary training is to be enlarged or even maintained.

The assistance of a European subordinate, preferably a R.A.M.C. Sergeant, is required, such a person trained in dispensing and nursing duties and possessing some technical knowledge of X-ray work would be absolutely invaluable. Such a post would be economically sound for X-ray work and dispensing alone.

(*b*) Hospital Assistants.

(I) The most highly skilled Africans in the Department are the hospital assistants who receive a three years course of instruction at the Blantyre Mission Hospital (Church of Scotland).

The Syllabus of training includes the following subjects :—

PART I.	PART II.
Elementary Anatomy.	Medicine.
Elementary Physiology.	Surgery.
Dispensing,	Midwifery.
Hygiene and Practical Sanitation.	Laboratory work.

Unfortunately no facilities exist at present in this country for secondary education and consequently the candidates for this examination have not received a sufficiently sound general education to make full use of the technical instruction given to them during their course.

(*c*) Sanitation.

Owing to the financial situation no expansion of the African sanitary staff has been possible for some years.

The native staff attached to the two Sanitary Superintendents obtains practical training but owing to the scattered distribution of the staff and the nature of the duties required of the Superintendents, very little time can be devoted to any organized training.

Classes were held for instruction on sanitary duties to within the last few years but as no recruits have been engaged for some time, the native sanitary inspectors in the out-stations have deteriorated considerably both in their work and knowledge.

A third European Sanitary Superintendent is urgently required in order that increased supervision can be provided and theoretical and practical training be maintained.

(*d*) Medical Schools.

The importance of an adequate medical service is generally admitted. It would, however, appear impracticable in the African Colonies and Protectorates to attain the standard aimed at in European countries (League of Nations) by the provision of one qualified practitioner to every 2,000 persons. Some 800 doctors would be required in Nyasaland before this ratio could be reached.

Financial circumstances alone would prevent the consummation of this ideal. Nevertheless, the claims of preventive medicine apart from the needs of the population for hospitalization, are very urgent.

Little progress can be achieved unless conditions are improved on sound hygienic lines by the prevention as well as the treatment of disease, and medical services made more generally available for the indigenous population.

Under these circumstances the training of Africans becomes a factor of immense importance and the provision of more and more Africans trained at medical schools a measure of urgent necessity.

All East African Territories are, so far as I am aware, devoting a portion of their energies to the Medical Training of Africans and without entering the field of controversy raised by investigations into the educable capacity, cerebral development and intelligence of native races, it is considered that the East African native can be trained to perform in a wholly adequate manner the duties required in a modern hospital of a competent nursing orderly. Further than this, every now and then, there comes to the front a native endowed with sufficient mental capacity to reach, given suitable educational facilities, the European standard required for a medical practitioner.

It is of course evident that under the present rural conditions, environmental, physical and social, the native is backward and is severaly handicapped by both nature and nurture in his endeavour to raise the standard of his civilization.

Such conditions can be improved. For some years to come it is probable, however, that the supply of candidates considered suitable for training to become qualified medical practitioners will be very small and the establishment of one university type of training centre for the Eastern African group of countries should be sufficient.

Lastly, it is necessary in order that a concise and progressive policy of medical training may be formulated, to have the ultimate aims, objects and scope of the medical education of the native clearly defined.

Should natives be trained to become doctors, or following the lead of India, assistant or sub-assistant surgeons, or hospital assistants or merely the humble dresser or dispenser?

It is a moot point whether educated Africans could, at any rate in this country and at the present time, earn a livelihood as medical practitioners.

The average income of the villager is so insignificant that it would scarcely yield even to the native private practitioner an adequate return for the expense of qualifying.

The alternative to private practice would be service with Government; so far, no posts exist which could be offered to candidates possessing such qualifications unless the posts now provided for Assistant and Sub-Assistant Surgeons were to be thrown open and were acceptable to them.

At present in Eastern Africa the only medical school operating and possessing the necessary compass of educational facilities is Mulago. It should be possible and practicable, if the necessary provision is made for their absorption after qualification, to send selected candidates from Nyasaland, after receiving a secondary education, to Mulago.

Meanwhile, medical education can be undertaken for the purpose of training hospital assistants, laboratory assistants, dispensers, midwives, nurses and dressers, with the end in view, that by the provision of such trained native personnel it will be possible to extend and to expand medical services to meet to some extent the urgent needs of the indigenous population.

D. RECOMMENDATIONS.

I. HOSPITALS.

During the second half of the year an application was made to the Colonial Development Advisory Committee for funds to provide a new European Hospital at Zomba.

The need for a new hospital is a very real one, the present building being a converted bungalow some 30 years old, which has been added to, patched up and repaired until very little of the original building has been left.

It is a most unsuitable and insanitary structure, and although water carriage sanitation has recently been installed, yet the ordinary conveniences of a hospital are sadly lacking.

As pointed out in another part of this Report the needs of the European community are served by two small hospitals, each capable of accommodating some 10 patients, situated respectively at Blantyre and Zomba some 42 miles apart.

Each hospital requires a considerable staff, while the average daily number of patients in both hospitals amounted in 1934 to 6.17. The figures given in the hospital returns are as follows :—

(I) BLANTYRE.	
Average daily number of European Officials in Hospital	.31
,, ,, ,, ,, ,, Non-Officials ,, ...	2.79
(II) ZOMBA.	
Average daily number of European Officials in Hospital	1.17
,, ,, ,, ,, ,, Non-Officials ,, ...	1.90
Total ...	6.17

It would appear most uneconomical for Government to maintain two hospitals so near to each other and it is suggested that it would be sound policy to hand over the Blantyre Hospital to any municipal or other body that would be prepared to run it as a public institution. A Government grant could be made for a number of years until the institution was placed on a sound footing.

With the provision of an ambulance, and provided that a new hospital is erected at Zomba, all Official cases in Blantyre, Limbe and Zomba could be dealt with in the one institution.

II. INFANT WELFARE AND MATERNITY WORK.

As already pointed out in Section II of this Report, the infantile mortality rate, according to such figures as are available, is a high one. Unfortunately the Medical Department is practically destitute of means of attacking this problem, as with the exception of the Native Hospital at Zomba, where one European nursing sister is posted, no European women are employed by the Department on nursing or health duties in connection with the general African population.

There is a very urgent need for the provision of European nursing and health sisters for the larger towns and hospitals, and with the increasing confidence displayed by the natives in European methods of treatment, and with the steady increase in the admission of women and children patients to hospital, (during 1934 out of 8,647 admissions 2,111 were female patients) the problem of their nursing and treatment is becoming one of ever increasing urgency. The difficulty of dealing with maternity cases at hospitals at which the staff often consists of a Medical Officer and male native attendants is a very real one. Every effort is made to attract native women to act as nurses, but from practical experience it would appear almost impossible to do so unless there is at the same time a European nursing sister employed at the hospital.

Further, the provision of a European health sister at one or two of the larger hospitals would allow of a commencement being made with infant welfare and ante-natal work.

Maternity wards already constructed could be opened and put to their proper use and native nurses could be trained and instructed in midwifery.

The provision of European nursing sisters at some of the larger hospitals would ensure the more efficient management of the hospital, would allow the general training of native nurses and would encourage the attendance of women and children for treatment.

As mentioned in the last Annual Report the appointment of at least one Lady Medical Officer trained in child welfare work is considered to be essential.

III. SANITATION.

There is evidence that the 'promotion of Public Health' has not progressed to the same extent as other activities in the Protectorate.

Sanitary surveys made in three localities, viz., Zomba, Lilongwe and Port Herald disclose a a very disquieting state of affairs.

It is true that Ordinances, such as the Townships Ordinance and the Sanitary Boards Ordinance, exist for the purpose of declaring an area a "Township" or a "Sanitary Area" with the attendant Rules and Byelaws, yet it is insufficiently realised that by such means alone progress cannot be made.

The native population of this country amounts to over one and a half million, whereas the sanitary personnel to deal with this population is two European Sanitary Superintendents and 16-17 inadequately trained Native sanitary inspectors.

The two European Sanitary Superintendents are engaged almost entirely in the European areas, one at Blantyre and Limbe and one at Zomba; when these Officers proceed on leave no individual with any technical training is available in the Department as a relief so that the appointment of at least one more Sanitary Superintendent is very necessary.

The insanitary conditions of the townships can be attributed to a large extent to (i) the lack of technical supervision of the native personnel performing sanitary duties and to (ii) lack of funds to carry out the recommendations made by their medical advisers.

In the majority of cases such local authorities have the advice and assistance of a Government Medical Officer or Sub-Assistant Surgeon, but when it is realised that these Officers have immense districts to look after and have multifarious duties to perform, it must be evident that the time they are able to devote to the supervision of detail matters of sanitation is strictly limited.

Moreover, under present conditions the sanitation of native rural areas is almost entirely neglected, the native staff is totally inadequate and insufficiently trained.

In order to carry out such measures as the improvement of housing, the sanitary disposal of night-soil and refuse, the improvement of market places and village water supplies, additional native sanitary staff is required. For such staff to be effective instruction and supervision is necessary, an increase in the establishment of European Sanitary Superintendent is, therefore, more than ever essential.

IV. DEVELOPMENT OF RURAL AREAS.

In the Annual Report for 1933, the value and importance of co-operation between Government Departments in any campaign undertaken for the improvement of rural conditions was stressed. The matter is put in a nutshell in the foreword to "Remaking of Village India" which reads as follows:—

> "The success of all measures designed for the advancement of agriculture must depend upon the creation of conditions favourable to progress.
>
> If this conclusion is accepted, the improvement of village life in all directions assumes at once a new importance as the first and essential step in a comprehensive policy designed to promote the prosperity of the whole population.
>
> The demand for a better life can, in our opinion, be stimulated only by a deliberate and concerted effort to improve the general conditions of the country side".

The general conditions under which natives live in the rural areas of this Protectorate are without doubt unsatisfactory in the extreme.

They are born, live and die under the most insanitary conditions, they are, despite the benefits of education and the "Pax Britannia" on the whole very poor and are ignorant even of the most elementary principles of hygiene.

They become as soon as they are born, infected with malaria, hookworm, bilharzia and other endemic diseases, all of which are preventable.

Water supplies are often foul and infected. Dietaries are, as a general rule, inadequate and food supplies are inefficiently stored. In short, conditions of life are such that every person is necessarily exposed to disease, spread of infection is assisted and ignorance and superstition play a large part in every native's existence.

How can such conditions be improved and how is any physical, mental and social advancement to take place?

It is submitted that much can be done for the improvement of rural conditions without any considerable expenditure of funds, firstly, by the close co-operation of every department and mission concerned with native welfare and, secondly, by the employment of Africans trained in the elementary principles of:—

(I) Agriculture.
(II) Animal husbandry.
(III) Forestry.
(IV) Hygiene and Sanitation.
(V) Carpentry and Masonry.

Such trained Africans might be termed "Welfare Workers". Candidates would have to be carefully selected from men of good standing, picked by the Native Authority and approved by the District Commissioner.

A training college (The Jeanes School) already exists and it is understood from the Director of Education that no great alteration would be necessary to enable candidates to be trained in the fashion indicated above.

A scheme has already been put forward for training agricultural demonstrators at the Jeanes School and if financial assistance can be procured from the Colonial Development Advisory Committee, the scope could be enlarged to give a community training on the lines suggested.

Such a training scheme would be the first of its kind, as far as I am aware, in Eastern Africa and would provide the necessary stimulus for increased production, a higher standard of wealth and living and increased prosperity.

V. MEDICAL BUILDINGS.

The provision of a new medical store is also a matter of some urgency. The present building, a converted bungalow, is as unsuitable a building as it would be possible to find. Space is inadequate and equipment is housed on both verandahs until required.

The arrangement of drugs and dressings is cramped and in the event of a fire little could be saved. The lighting is poor and the store is neither rain proof nor rat proof.

VI. TRAINING OF AFRICANS.

A plea for the provision of a training school has already been submitted under the Section dealing with Training of Africans.

So much more could be accomplished in both preventive and curative medicine by an increase in the trained technical staff of the native hospitals and dispensaries.

More hospital assistants, laboratory assistants, sanitary inspectors, native nurses and midwives are urgently required.

VII. LUNATIC ASYLUM—ZOMBA.

This institution is under the executive control of the Chief Inspector of Asylums who is also Chief Commissioner of Police.

The Asylum is in charge of a European Superintendent—who is also the Superintendent of the Prison—and is visited weekly by the Medical Officer, African Hospital, Zomba.

The institution should be reconstructed and re-organized on the lines of a Mental Hospital and be taken over entirely by the Medical Department.

European staff, qualified in mental nursing should be employed. A married European male mental nurse with a wife also qualified would be the most economical arrangement.

VIII. LEGISLATURE.

Lastly, it is suggested, in order that advice on public health matters may be more directly available and particularly as the promotion of public health is becoming more and more intimately connected with any activity of Government, that the Director of Medical Services should be given a seat on the Legislative Council of the Protectorate.

SECTION IV. PORT HEALTH WORK AND ADMINISTRATION.

A small quarantine camp is maintained at Port Herald on the Beira—Nyasaland Railways for the detention of Natives and Asiatics entering Nyasaland who may be suffering from an infectious disease or who lack the necessary certificate of vaccination.

The numbers so detained during the year were:—

Men	Women	Children
36 ...	28 ...	34

SECTION V. MATERNITY AND CHILD WELFARE.

It is satisfactory from one point of view to record that steady progress in infant welfare work is being made and it is evident from the statistics furnished by mission centres subsidized by Government and from visits paid to other institutions where such work is being carried out and which are not state aided, that real interest is being displayed by the native and slowly and surely the confidence of the women (always the last to respond to effects of civilization) is being gained.

It is not so satisfactory from another point of view, viz., that of the Medical Department to have to take a somewhat inactive part in such an immensely important branch of public health.

Owing to the financial situation it was found by Government impossible to augment the staff of European sisters or to include provision for any health visitors and the two clinics (at Port Herald and Fort Johnston) already erected are being utilized to increase the ordinary hospital accommodation, while the clinic at Kota Kota is not yet completed.

The economic depression has not yet passed and the business of making both ends meet is still one of the chief problems of Government.

It is not easy to assess the financial value of public health measures and one can only say that such measures undertaken with the definite object of rendering the youth of this country, from a physical and mental point of view, assets instead of liabilities, and which aim at preventing disease by the education of the mothers and safeguarding the health of the children through the most important years of their life, must be of inestimable importance in the economic progress of the native community in particular and the country in general.

Many striking results have been obtained by public health measures and the fact that at home the infant mortality rate has, during the past forty years, been reduced from 151 deaths per 1,000 to 60 (1930) deaths per 1,000 is definite evidence of their value.

Apropos of these remarks, an extract from the Annual Report of the Chief Medical Officer of the Ministry of Health, (1930) is quoted below:—

> "In the presence of these figures (in 1930 the expenditure on insurance benefit to the sick and disabled was £15,000,000 and the loss of time involved was 26,000,000 weeks), we cannot fail to recognize the importance, not to say gravity, of the meaning to a nation of sickness, much of it minor in character and degree. We become also the witnesses of health as a national asset, as the primary foundation of capacity, industry and output of productivity. A comparison of these returns for 1930 with the similar returns which appeared in my report for 1929 give us at least this satisfaction, that in 1930 there was a saving of nearly two million pounds and of three million weeks of time to industry".

With regard to individual effort the Missions are almost solely responsible for any progress that has been made; two Missions, viz., the Livingstonia Mission at Bandawe and the Church of Scotland Mission at Blantyre are assisted by grants from Government while others e.g. the Dutch Reformed Church Mission at Mlanda and the U. M. C. A. Mission at Kota Kota are not state aided.

The Church of Scotland Mission clinic at Blantyre is in charge of a Lady Medical Officer who is assisted by a trained European nurse.

An increase has been noted during the year both in the number of ante-natal attendances and in *normal* maternity cases.

An infant welfare clinic is held weekly; short lectures are given to the mothers; the infants are weighed and measured; the attendances are increasing.

A weekly clinic is also held at Ndirande some 2-3 miles from the Mission, this clinic is well attended.

Records of all out-patient attendances are kept.

At the Mission, six native nurses are now in training; they receive instruction in midwifery, elementary anatomy and physiology, hygiene, general nursing and ward management.

These nurses are all young widows, as native custom will not permit of unmarried girls attending to cases of labour.

A course of instruction for midwives was held from May to October and four women attended, all could read and write, instruction was given in midwifery (practical), elementary anatomy and physiology, post natal nursing and infant welfare.

Three of these women are now practising in their own district, and six more who were trained in 1932—1933 are also practising within a radius of 26 miles of the Mission. All are visited regularly, and the records of their work are inspected. Much valuable work is being performed by these women.

At Bandawe the centre is in charge of a trained European nurse only, consequently its scope is strictly limited.

Child Welfare and Maternity Clinics are also established at the Dutch Reformed Church Missions at Mkhoma and Mlanda and are staffed in each case by a resident Lady Medical Officer and a trained European nurse.

In the Mlanda district two district clinics have been successfully inaugurated.

For the last six years at Mlanda the average number of maternity cases treated at the Hospital was 40.5.

The clinic at Kota Kota under the aegis of the U.M.C.A. is staffed by two trained European nurses, unfortunately no statistics are available for this Report.

At the Jeanes School about 10 miles from Zomba the infant welfare and maternity clinic continued to function very satisfactorily.

As a trained European nurse was in charge throughout the year, the figures for attendances show an increase over those of the previous year.

The following is a summary of the work:—

Visits paid by health visitor	29
Total confinements (including district)	41
Children admitted to clinic	106
Out-patients treated at clinic dispensary:	
Children	3,452
Women	1,254

Of the 41 confinements, six were abnormal. Two maternal deaths occurred. One case had been in labour five days previous to admission to the centre and died before delivery, the second maternal death occurred three days after craniotomy was performed for contracted pelvis.

Forceps were applied on two occasions only.

The Medical Officer who visits the clinic weekly, is also available if assistance is required for serious or complicated cases.

Next year, if staff is available, it is intended to hold a child welfare clinic at the Native Hospital, Zomba; a European nursing sister with experience of this work has been posted to this Hospital and a Medical Officer who has taken a course in this branch of medicine is available.

SECTION VI. HOSPITALS AND DISPENSARIES.

(*a*) EUROPEAN HOSPITALS.

Two hospitals for the treatment of European patients are maintained by Government at Blantyre and Zomba some 42 miles apart. No other hospital accommodation, with the exception of a few beds available at certain Mission hospitals, exists in the Protectorate. Each Government hospital can accommodate 10 patients. Except for the lack of accommodation, as mentioned above, it would appear quite unnecessary for Government to maintain two hospitals with full and expensive staffs in such comparatively close proximity to each other. An ambulance could easily make the journey between the two towns in one hour and a half.

Very few officials are resident in Blantyre and its neighbourhood, the majority reside in Zomba and it would seem reasonable from an official point of view for Government to maintain one hospital only, preferably at Zomba.

Moreover, it has already been laid down by the Secretary of State that this Government does not accept any responsibility for providing hospital accommodation or medical attention for the non-official European community.

Funds are being sought for the erection of a new hospital at Zomba and perhaps by the time it is completed it will have been found possible to hand over the hospital at Blantyre to the non-official community as a free gift and to make, if necessary, a subsidy for its maintenance.

(*b*) NATIVE HOSPITALS.

With the assistance of the Colonial Development Fund, *twelve* new hospitals have been constructed and taken into use with the exception of that at Zomba which was unfortunately still incomplete at the end of the year.

Three other hospitals have had additions made to them.

These hospitals are, for the most part, well constructed buildings of brick and iron and are provided with the usual adjuncts in the shape of operating theatres, administration blocks, isolation blocks, sanitary annexes, kitchens, laundries and quarters for the native staff.

At two of the hospitals, namely, Fort Johnston and Port Herald, special blocks for maternity cases and for infant welfare clinics have been provided; each block can accommodate some 12 in-patients.

The maternity block at Kota Kota has not yet been completed, as expansion, without the necessary staff, is scarcely justified.

Hospital accommodation for the native population numbering some 1,600,000 is provided to the extent of 630 beds, so that the ratio is approximately 1 bed for every 2,500 persons.

The standard adopted at the recent Conference on Rural Hygiene under the auspices of the League of Nations is 2 beds per 1,000.

Such a discrepancy is, however, more apparent than real as a large proportion of the population lives at vast distances from the district hospital without any means of transport; communications are often very difficult.

The majority of the hospitals have been established a short time only and it is unfortunate that in many cases, they remain permanently half empty. Considerable propaganda, personal acquaintance and contact with the native is required before their confidence can be gained.

Approximately £36,003 has been expended in this country on the provision of native hospitals and it is a question at this stage of the country's development whether a portion of this expenditure might not have been diverted with advantage to measures directed towards the prevention rather than the cure of disease.

The value of curative medicine must not however be underestimated.

The true perspective is perhaps difficult to gauge and it would seem financially impossible for any African Colony to be hospitalized, say, to the extent required by European standards.

Curative medicine apart from alleviating distress plays a most important part in medical propaganda, by such means patients are attracted to the hospital and their confidence obtained.

"A rupture cured is a disciple gained."

Much valuable work is being performed in native hospitals and definite attempts are being successfully made to attract surgical cases to come for treatment.

Medical Officers on tour take great pains to obtain the confidence of their patients and simple operations are performed under local anaesthesia as demonstrations of the value and effect of treatment. Chiefs and headmen are encouraged to visit hospitals and to see for themselves how patients are looked after and fed. Whenever possible cases to whom relief has been afforded are exhibited.

As an illustration of the interesting surgical cases which are being dealt with and the procedure adopted both from an operative and anaesthetic point of view the following short notes from the Medical Officers in charge of the Hospitals at Fort Johnston and Zomba respectively are quoted:—

SURGERY IN SOUTH NYASA DISTRICT.

> "During 1934 an attempt was made to attract surgical cases to Fort Johnston Hospital. Various means were employed to promote confidence, for instance, the first case of hernia cured by operation was retained as a member of the Sanitary Gang and he was therefore available for demonstration as required. Exclusive of abscess, whitlow and the like, 222 patients were dealt with, of whom 176 were male and 46 were female, 259 operations were performed, 101 with local and 158 under general anaesthesia. The difference between the number of patients and that of operations is accounted for by the "second stage work", mainly on leg ulcers. Major and minor cases were respectively 203 and 56.
>
> Preoperative treatment.— In this hospital, considerable attention is given to preoperative measures on which, to a great extent, the safety of the patients depend.
>
> The grade of risk is estimated by a thorough examination of all systems, diseases such as ankylostomiasis or malaria receiving attention before the patient is considered fit for operation.
>
> Rest in bed for at least 36 hours is the minimum before an operation of any magnitude. Mental rest is essential. To attain this end and to give patients confidence, they are billeted with convalescent surgical cases.
>
> Preliminary starvation and purgation are avoided. Patients are given as much fluid, carbohydrates and alkalies as they can comfortably take. They are allowed to eat within 2 or 3 hours of operation to avoid the acidosis of starvation.
>
> It is of interest to note that beyond soap and water, and a spirit dressing, repeated at the time of operation, the skin was not prepared in any other way. No sepsis has resulted from this practice, which is simple, cheap and effective.
>
> The following interesting cases were met with:—
>
> (a). APPENDICITIS.
>
> According to the Medical Reports of the Protectorate, appendicitis would appear to be rare amongst natives, yet during the last quarter of the year 6 cases were admitted to hospital.
>
> All patients gave a history of long standing gastro-intestinal upset. Their symptoms were:—

General	Headache, constipation.
Referred	Vomiting at varying intervals after food. Occasional pain in the upper abdomen.
Local	With one exception all complained of a dull ache in the right iliac fossa. This was a periodic symptom. In no case could acute symptoms be remembered.

Examination showed pain and muscular resistance in the right iliac fossa. In two cases pain was elicited by pressure over the epigastrium, but on palpating the right iliac fossa at the same time, the tenderness disappeared from the epigastrium and became localized at McBurney's point.

In one case pain and muscular resistance were confined to the right lumbar region, (retrocæcal appendix).

All patients agreed to operation. Appendectomy afforded complete relief to each.

The condition of the specimens was as follows:—

Case 1	Retrocæcal in position. In a state of chronic fibrosis: contained a fæcal concretion.
Case 2	Pelvic in position. In a state of chronic fibrosis.
Case 3	Retrocolic in position. Fixed to the back of the ileo cæcal junction by a firm adhesion.
Case 4	Retrocolic in position. Thick walled and fleshy.
Case 5	Retrocolic in position. Thick walled and fleshy. Bound by adhesions into an S shape, the lower part near the cæcum being turned at an angle of 90 degrees to the upper part and fixed in this position by adhesions.
Case 6	Pelvic in position. In a state of chronic fibrosis.

The specimens from 4 and 5 were sent to the Medical Laboratory, Zomba.

(b). ABDOMINO-SCROTAL HYDROCELE.

So far as I can ascertain this appears to be a rare condition and I am unable to find many references to it in the surgical literature at my disposal.

In our case, in addition to a large left scrotal hydrocele, a swelling of considerable size was found occupying the lower abdomen. It lay, resembling a bladder in retention, in the mid-line between the umbilicus and the pubis. Fluctuation was obtained between the abdominal portions of the hydrocele, showing that the two tumours were connected. From the relation of the inguinal ligament, at the pubic attachment, to these tumours, they were apparently separate and distinct.

At operation the abdominal tumour was easily shelled out from the extraperitoneal fat in which it lay behind the recti muscles and was removed together with the scrotal portion. The connecting channel between the two pierced the posterior wall of the inguinal canal near the pubis and, passing out through the external ring joined the scrotal swelling.

The specimen is in the Medical Laboratory, Zomba.

(c). VESICO-VAGINAL FISTULA.

Native women being shy of declaring gynæcological complaints we are fortunate in having had 5 such cases during the year viz., two patients with pyosalpinx and procidentia, one with a fixed retroversion of the uterus and two with vesico-vaginal fistulæ. The last condition is the most interesting.

Both the latter cases were such that local repair was impossible and they were therefore treated by transplantation of the ureters into the pelvic colon, a procedure which relieves urinary leakage by substituting the rectum for the bladder as a urinary reservoir.

Although the "one stage" operation, using ureteral catheters is the most popular, I used the "two stage" method for, since only a few opportunities will occur to any one person, it seems better to gain useful experience in the method to which one is accustomed than to try the numerous plans that are advocated from time to time.

The patients were operated on by the "Technique 3" of Coffet. One ureter is transplanted at a time. The cut end of the ureter is ligated, a double strand of silk penetrates the mucosa of bowel and ureter and is tied tightly. It cuts through in 24 hours and completes the anastomosis. (Jour. Amer. Med. Assoc. 1932 Oct. 15. 1920).

The first case died some time after the completion of the second stage. The following are details regarding the second patient, who recovered.

She eats well, sleeps well and is ordinarily active. Is thin and anaemic. Presumably stabilization is not complete and she is accustoming herself to the element of constant mild renal infection and acquiring complete rectal toleration. The constant absorption of urine from the bowel must have an effect on general nutrition. She is abnormally thirsty and drinks copiously of water.

Rectal toleration. Toleration was not acquired at once, but after the second operation came remarkably quickly. Immediately after the first stage, urine ran away constantly from the bowel, so that it was not necessary to keep a catheter in the rectum. Once control was established, the average time for which the patient could hold urine was 3 hours, but she stated that if necessary she could hold it longer. She gets up once during the night to empty the bowel of urine. The usual amount voided at any one time was 5 oz. The amount which could be comfortably retained was 10 oz. The maximum passed at any one time was 15 oz.

The anastomosis is therefore functioning well and there seems every reason to hope that, before long, her general health will not be far removed from normal.

(d). VESICAL CALCULUS.

A large vesical calculus, 4½ oz. in weight was removed from a female patient. Apart from the size of the stone, it was remarkable from the fact that it was shaped like an hour-glass and the large part was contained within the bladder. The neck of the stone passed through the internal urinary meatus and a lower and smaller portion lay in the membranous urethra which was dilated to contain it.

(e). HYDATID CYST OF SPLEEN.

Little purpose would be served by giving a description of the clinical appearance of this patient for the diagnosis and treatment were obvious. It is worthy of record, however, for hydatid disease is thought to be rare in Nyasaland. Cases have been found, but always in natives who have visited other parts, notably the Coast. Our patient had never left his village of Malindi, by the lake shore.

Splenectomy was performed with the invaluable help of Dr. Wigan, Universities Mission. It was found that the entire splenic substance had been compressed into a thin capsule surrounding the hydatid cyst which was of massive proportion. Unfortunately the patient died some days after operation from reactionary hæmorrhage. The specimen was sent to the Medical Laboratory, Zomba.

THE FOLLOWING CONCLUSIONS AS TO TREATMENT WERE FORMED.

(*i*) *Hydrocele.* 14 cases were treated by the usual method of Jaboulay and 24 by that of Gerhardt. (Zentralb. f. Chir. Sept. 3. 2159).

In this latter method, under local anæsthesia the sac is opened at the neck, the contents are evacuated and the cavity is swabbed out with 10% Formalin in water.

In our cases a considerable amount of painless œdema of the scrotum resulted. At first alarming, this resolved after a period of not more than 10 days when the parts returned to normal.

Judging by early results this seems a rapid and effective method of treating a common complaint. There is little upset to the patient.

(*ii*) *Indirect inguinal hernia.* 16 cases were dealt with. 10 were of long standing and 7 of considerable size. In 9 cases there was a gap in the transversalis fascia at the internal ring. This fascial boundary of the posterior wall of the canal was so weak that the apposition of the internal oblique to the inguinal ligament in front of it was not considered a sufficient repair. The method of Gallie was therefore adopted using a many-tailed strip of fascia lata in the manner described by him. (Ann. of Surg. 1932. Oct. 551).

In the course of my previous experience in Cyprus I had a recurrence rate of 2.3 per cent. in cases treated by the method of Bassini. Recurrences occurred in individuals who had had large herniae of many years duration. They were all direct in type, showing the weakness of the Bassini operation to be that the condition of the fascial boundary of the posterior wall of the inguinal canal is not taken into consideration. I therefore do not use it now where there is any weakness at the internal ring. I am sure that it should not be the routine operation for inguinal hernia.

(*iii*) *Chronic leg ulcer.* From a comparison of the results of treatment in 392 cases of chronic leg ulcer, it would seem that the application of adhesive plaster is not always the best remedy for all degrees of ulceration, nor is it always successful.

An ulcer of any severity treated thus has a weak scar which breaks down easily under trauma. Although the treatment is ambulatory, it is prolonged. It fails entirely when applied to the early exuberant stage of ulceration.

I find that a chronic ulcer with destruction of deep tissues is best treated by a pedicle graft which gives to the lesion the same protection as healthy superficial tissues elsewhere and is able to withstand hard use. The patient need be in hospital only 20 days.

A chronic ulcer, perhaps extensive, but not penetrating deeply may be treated by strapping or by Thiersch grafts, strapping being more convenient since this is the common type of ulceration ".

C.H.H.

(II) ZOMBA.

" NOTES ON ANAESTHESIA AND EVIPAN SODIUM IN THIS COUNTRY ".

" Many difficulties are encountered in this country in obtaining satisfactory anaesthesia. No government hospital possesses the services of two medical officers and the surgeon has perforce to divide his attention between his operation and the anaesthetist, the latter usually a hospital assistant with but little skill. Furthermore, it is obvious that a medical officer working under these circumstances cannot give instruction in the art. Unusual operations, too, occur which require apparatus and anaesthetics unobtainable here at present. Observations and some suggestions, therefore, for improving the general standard are obviously desirable.

TYPES OF ANAESTHETIC.

Anaesthetics as distinct from local and spinal analgesies in use here are, chloroform, ether, rectal ether and inhalation mixtures of chloroform and ether.

For many years, chloroform was considered the only anaesthetic practicable in this climate, and its administration has monopolized the teaching of anaesthetics to hospital assistants. Little attention appears to have been paid to the opinion held in Europe that except for maternity work, the risks attached to chloroform almost warrant its complete abolition, even in the hands of skilled administrators. Judging from the large number of cases in this country which require artificial respiration during operation, and a certain number of deaths, it appears at least no safer here than elsewhere.

On the other hand, pure ether can be administered quite satisfactorily and is free from danger, providing a clear air-way is maintained. It should be given with a close fitting Bellamy Gardner mask resting on gamgee tissue, the latter having a slit for the nose and mouth. Between pouring on the drug, the mask and face should be lightly wrapped round with a towel, in order to produce "rebreathing". If any trouble is encountered in maintaining surgical anaesthesia, the addition of one part of chloroform to nine parts of ether is sufficient to overcome the difficulty. Another method, useful in warm climates is the Shipway apparatus.

It is much easier to diagnose the stage of anaesthesia with ether and to recognize the "automatic breathing" without recourse to pupillary signs while the audible and faintly stertorous breathing, has a sedative effect on the surgeon's nerves.

Of ethyl chloride in this country, my experience has not been sufficient to form any conclusions.

Types of Operation.

Quite a large proportion of surgery here is of a minor character in which profound and prolonged anaesthesia is not required, and many facial and intrabuccal cases performed under chloroform and ether given on a mask cause inconvenience to the operator. In Europe, it is easy to obtain an intratracheal ether or gas and oxygen for these latter cases, but impossible here. However, for both these types of operations Evipan Sodium, an intravenous anaethetic invented about 2½ years ago, promises to be of considerable utility, and several cases have been anaesthetized with this drug during 1934 at the African Hospital, Zomba.

Evipan Sodium Anaesthesia.

Twenty adult cases received this drug and the following remarks apply to the technique used and the results obtained. Premedication with morphia and sometimes scopolamine has been advised by some writers. In the case of major operations it certainly tends to deepen the anaesthesia produced, but is by no means universally required.

The drug is sold in ampoules containing 1 gram, along with companion ampoules containing 10.5 c.c. of distilled water. The distilled water is sucked up in a 10 c.c. syringe, and ejected into the ampoule containing the drug. By withdrawing the piston a few times solution is rapid, and the dissolved drug is finally taken up into the syringe, and put aside.

After "scrubbing up" and donning gloves the operation area is prepared and surrounded by towels to avoid delay after the injection, and the whole arm on the side to receive the injection is prepared as for operation in order not to foul the hands of the operator.

A form of compressing the veins above the elbow having been applied, an assistant grasps the patient's wrist with one hand and supports the elbow with the other, thus fixing the arm in case of convulsive movements. The needle of the syringe is then made to puncture a vein, care being taken at the same time not to change hands on the syringe and dislodge the needle. The injection is given with the aid of a watch at the following rates :—

1 c.c. every 15 secs until 4 c.c. have been given, then 1 c.c. every 10 secs.

Almost every patient yawned as the 4th c.c. was going in and a few showed convulsive twitching of the extremities. After the 4th c.c. had entered the vein, anaesthesia commenced. It is said that the jaw drops at the commencement of anaesthesia, but this was not noticeable in the list of cases which follows :—

No.	Operation Performed.	Quantity of Evipan Given.	Character of Anaesthetic.	Complication.
1.	Thiersch graft	7.5 c.c.	Light	Nil.
2.	Drainage of orbital abscess.	6 c.c.	Satisfactory.	Nil.
3.	Drainage of inguinal abscess	6.5 c.c.	Very light and unsatisfactory.	Nil.
4.	Thiersch graft.	7 c.c.	Satisfactory.	Nil.
5.	Dental root extraction.	7 c.c.	Satisfactory.	Nil.
6.	Drainage of inguinal abscess.	7 c.c.	Satisfactory.	Nil.
7.	Incision and scraping of sinus in groin.	9 c.c.	Satisfactory.	Nil.

No.	Operation Performed.	Quantity of Evipan Given.	Character of Anaesthetic.	Complications.
8.	Drainage of abscess of thigh.	9 c.c.	Satisfactory.	Marked excitement afterwards
9.	Exploration of necrosed jaw and teeth extraction.	7 c.c.	Satisfactory.	Nil.
10.	Amputation of finger.	8 c.c.	Satisfactory.	Nil.
11.	Incisions in septic finger.	7 c.c.	Satisfactory.	Nil.
12.	Incision and scraping of sinus of leg.	7 c.c.	Satisfactory.	Nil.
13.	Evacuation of infected pelvic haematoma.	8 c.c.	Satisfactory.	Nil.
14.	Gutter operation for acute osteomyelitis of tibia.	10 c.c.	Satisfactory.	Nil.
15.	Drainage of axillary abscess.	7 c.c.	Satisfactory.	Nil.
16.	Salpingectomy.	8 c.c. and a little ether.	Satisfactory.	Nil.
17.	Kocher's radical operation for inguinal hernia.	8 c.c. and a little ether.	Satisfactory.	Nil.
18.	Dilatation and curettage for dysmenorrhoea.	10 c.c.	Light.	Vomiting afterwards.
19.	Excision of whole of left side of mandible.	11 c.c.	Very satisfactory, lasted for 30 minutes.	Nil.
20.	Manipulation of Colles fracture and application of plaster.	6 c.c.	Satisfactory.	Nil.

The dosage to be given varies with the depth and period of anaesthesia desired and more is required for a robust adult than for a cachectic or seriously septic case. It varies usually from about 4 c.c. to 11 c.c. The anaesthesia lasted for periods from 10 minutes to half an hour with usually 3 hours or so of sleep afterwards.

COMPLICATIONS.

In case No. 3 the needle slipped during a convulsive movement and some anaesthetic was introduced into the wall of the vein. The anaesthesia was very light and unsatisfactory, although the patient slept for many hours afterwards. In case No. 8, good anaesthesia was obtained, but after being returned to the ward, the patient became excited and violent, almost maniacal, for about 2 hours. This complication is mentioned by Westerborn in 20 cases out of 450 patients in a Swedish Hospital.

The vomiting experienced in case No. 18 after recovery of consciousness is apparently unusual in a patient fasting and prepared as this one was, for operation.

Other complications mentioned in literature are respiratory spasm during anaesthesia, headache, cutaneous idiosyncrasies, and peripheral neuritis afterwards. A few deaths from cardiac failure in toxic and aged patients have been reported and also some from liver trouble. None of these untoward effects occurred in the group of cases under consideration.

All the patients, with the exceptions quoted, stated they felt no discomfort neither during induction nor on recovery, and those operated upon for minor conditions were able to leave hospital the same day.

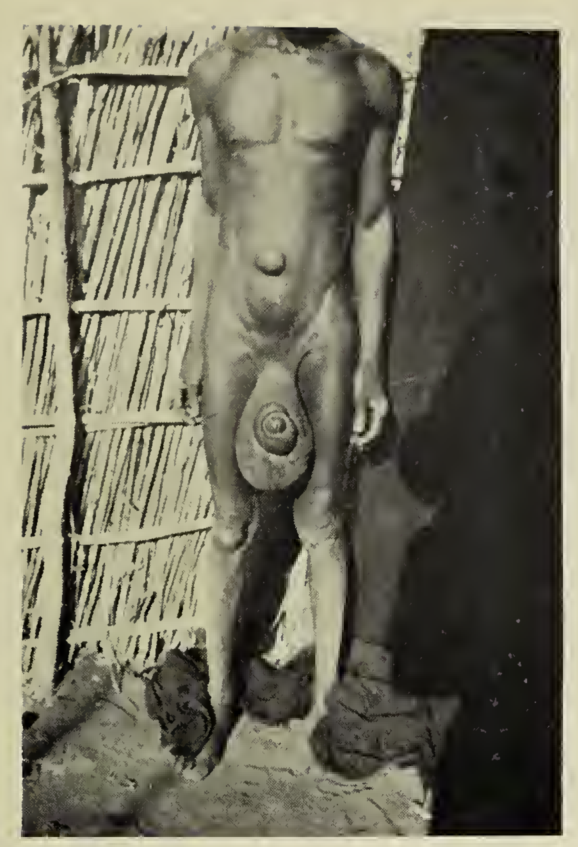
CONCLUSIONS.

The technique and results of 20 cases of Evipan Sodium anaesthesia at the African Hospital have been recorded. The results have been very satisfactory and the drug is of particular value in minor surgery and in surgery of the head region. Occasionally the anaesthesia is light, but causes no more inconvenience that an unskilled anaesthetist giving chloroform.

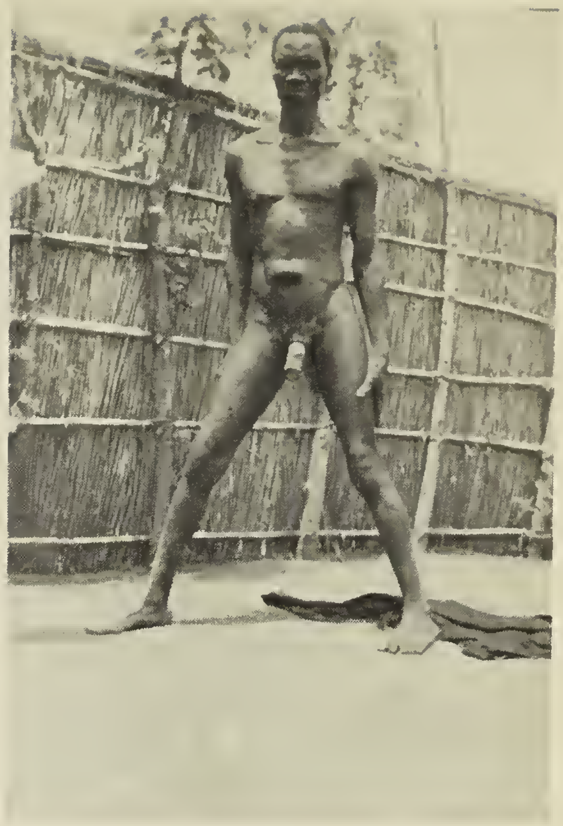
A plea has also been put forward that for routine work chloroform be supplanted by ether, which is not only practicable, but easier and safer in its administration ".

E.J.B.

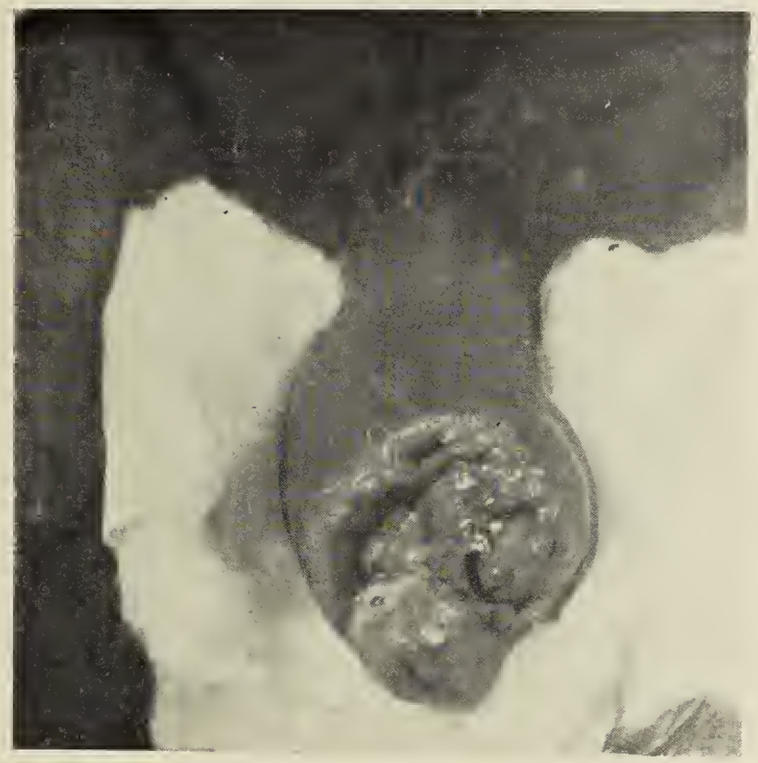
The following photographs illustrate other interesting surgical cases met with at Fort Johnston.



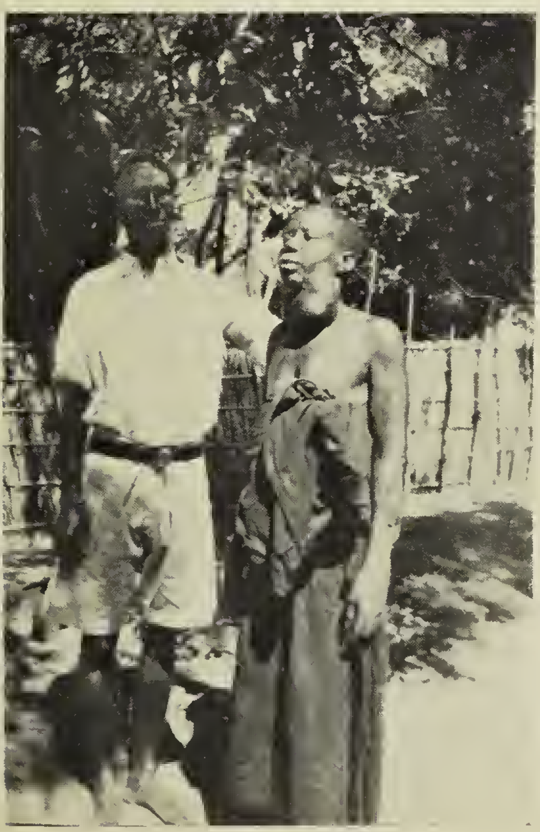
Elephantiasis of the Scrotum
(before operation).



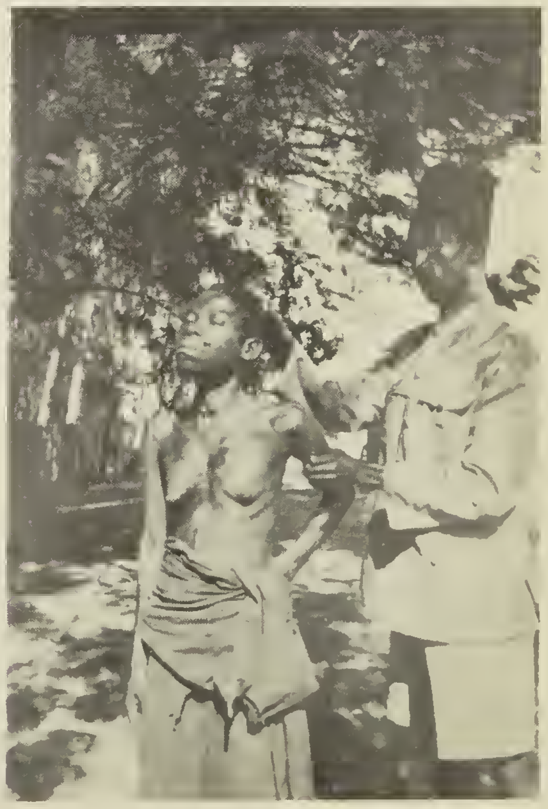
Elephantiasis of the Scrotum
(after operation).



Carcinoma of Penis.



Adenoma of Thyroid.



Carcinoma of Larynx.

c RURAL DISPENSARIES.

Owing to the benefactions of the Colonial Development Advisory Committee the rural ispensary system has arisen from its bed of wattle and daub to a wealth of bricks and mortar and f some 92 dispensaries, 36 are now constructed of permanent materials.

Unfortunately the native staff in charge of these dispensaries has not progressed to the same xtent.

Owing to their lack of education and want of training, the majority of the native staff are nefficient, unreliable and undisciplined. Steps are being taken to improve matters and dispensers vill, as opportunities arise, be brought into the central hospital for "refresher" courses, the more gnorant and lazy are gradually being weeded out. Adequate supervision, perhaps one of the nost important factors in the efficient functioning of the dispensary system, is being insisted upon, nd as the transport vote has now been increased no difficulty should be experienced in this espect.

An attempt is also being made to standardize treatment at dispensaries and dispensers in harge will be given an indication of the diseases that can be suitably and effectively treated.

Drugs have been standardised and it is trusted that economy and increased efficiency will esult.

More time, if possible, will be devoted to training dispensers and a higher standard of education s being insisted upon for all native entrants to the medical service.

The further development of the rural dispensary is an interesting problem. At present it serves nly as a treatment centre for minor ailments, but considered in its true perspective as a health entre its evolution is comparatively simple. Having raised the standard of treatment and the efficiency of the dispenser, a few beds are added to the dispensary equipment and cases requiring hospital treatment can be looked after until such time as transport can be obtained for their removal to the central hospital. More beds are now added and a native midwife is posted, the wife of the dispenser or dresser in charge is trained in simple infant welfare, sewing and domestic science and classes are held for the villagers in the neighbourhood. Thus the Health Centre expands and the spear point of sanitary science penetrates into the camp of the backward races.

It is not intended to include in the body of this Report, as has been the custom in former years, separate reports dealing with each district, it is considered sufficient for the purpose to mention matters of special interest only.

A table showing the number of cases treated at each district Native Hospital during the year, as compared with the number treated for last year, together with the estimated population, area in square miles and principal medical staff is given below :—

SUMMARY OF NATIVE CASES TREATED.

	1933			1934*			Area in sq. miles	Rank of officer in charge	Population
	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries			
	In-Pts.	Out-Pts.	Out-Pts.	In-Pts.	Out-Pts.*	Out-Pts.			
Blantyre	—	7,785	22,033	—	8,126	25,079	860	S.M.O.	74,960
Chikwawa	142	3,695	11,674	285	3,831	9,979	1,897	S.A.S.	30,633
Chiradzulu	290	5,076	11,408	358	7,022	11,417	270	S.A.S.	80,190
Cholo	680	5,502	5,165	829	6,458	5,243	624	M.O.	63,823
Chinteche	1,196	9,287	5,815	547	3,785	6,003	2,572	Hosp. Asst.	49,000
Dowa	148	3,602	14,844	240	3,418	12,987	2,145	S.A.S.	121,771
Dedza	170	3,282	12,238	225	2,482	19,851	1,818	M.O.	137,900
Fort Johnston ...	614	4,576	8,147	783	5,963	8,170	2,468	M.O.	112,640
Fort Manning ...	295	2,583	6,463	349	2,572	7,107	1,453	S.A.S.	34,000
Karonga	335	9,115	16,007	491	8,240	21,337	3,117	M.O.	44,000
Kasungu	200	3,157	5.348	251	4,181	4,794	3,948	S.A.S.	29,500
Kota Kota	309	15,569	13,181	401	11,119	15,404	1,963	M.O.	73,000
Lilongwe	265	2,764	3,704	256	4,051	4,578	2,334	M.O.	137,716
Liwonde	120	3,185	12,838	163	3,725	12,904	2,045	Hosp. Asst.	60,972
Mlanje	334	5,605	8,210	702	10,163	9,489	1,531	M.O.	135,000
Mzimba	116	4,326	13,208	132	4,411	13,571	3,458	S.A.S.	134,000
Ncheu	217	4,663	11,596	250	7,970	11,571	1.132	Hosp. Asst.	79,700
Neno	—	—	5,174	—	—	8,204	—	S.M.O. Blantyre	15,495
Port Herald	292	8,705	22,919	259	2,733	16,803	747	M.O.	85,645
Zomba	1,116	5,923	28,368	1,553	8,431	36,556	903	M.O.	110,100
K.A.R. Hospital ...	483	3,238	—	413	3,675	—	—	,,	—
Central Prison Hospital ...	—	2,149	—	557	2,449	—	—	,,	—
	7,322	113,787	238,340	9,044	114,805	261,047			

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* All patients attending for treatment are now recorded first as Out-patients whether or not they are subsequently admitted to hospital. To obtain the total of those who received Out-patient treatment only, the In-patient figures should be subtracted from the combined total.

During the year Medical Officers were encouraged to make such investigations into rural conditions in their districts as time and funds would permit.

A summary of some of the result of the investigations made is given below :—

MEDICAL SURVEYS.

Medical surveys were carrried out in Mlanje, Fort Johnston, Cholo and Karonga Districts and at the Jeanes Training School, Zomba. No attempt is made to compare or co-relate results as the surveys were not performed in a uniform manner.

Arrangements have been made, however, for Medical Surveys to be carried out during 1935 in all districts at which Medical Officers and Sub-Assistant Surgeons are stationed. A uniform system of collecting and tabulating information has been adopted and the findings should afford valuable data upon which to base a policy for future Medical and Sanitary work.

Two surveys—at least—are to be performed in each district (a) in the vicinity of the hospital and (b) in a locality as far removed as possible from medical facilities.

In order to co-relate the findings, three age groups have been decided upon viz., (1) under 2 years, (2) over 2 years and under 10 years (3) over ten years.

Not less than one hundred members of each age group are to be examined in each locality.

The investigations will be specially directed to an examination of specimens of blood, urine and faeces for the presence of protozoa and helminths; estimation of the haemoglobin percentage by Tallquist's scale; determination of the spleen rate and the presence of abnormalities or other diseases. Information will also be collected upon the manner of life, water supplies, bathing places, foodstuffs, houses, the possession of live stock and the general environment of the people in relation to the public health of the community.

SUMMARY OF THE RESULTS OBTAINED DURING A MEDICAL SURVEY OF THE INHABITANTS OF (A) NTENJERA VILLAGE (B) MILONDE VILLAGE, MLANJE DISTRICT, 1934.

A. This village consists of some 60 huts situated about 200 yards from a stream.

Total number examined 152. (adults 64 children 88). Physical examination revealed—apart from minor complaints—one case of mitral stenosis, one case of arterio-sclerosis and three cases of pulmonary tuberculosis.

Thirty-two children (36.65 per cent.) under 15 years had enlarged spleens.

B. Milonde Village consists of some 240 huts scattered over a wide area. About 80 per cent. of the total population was examined. Two cases of pulmonary tuberculosis with positive sputa were seen.

		Number examined at (A).			Number examined at (B).		
		152			340		
Hb estimated by Tallquist's scale.	90%	0			10		
	80%	20			29		
	70%	59			51		
	60%	51			57		
	50%	15			24		
	40%	6			11		
	30%	1			6		
Faeces. Total examined		67			143		
Ascaris ova present in		10	=15% positive		68	=47.5% positive	
Ascaris and hookworm ova present in		19			23		
Ascaris and *S. mansoni* ova present in		3		=52.24% positive	3		79% positive
Hookworm ova present in		0			18		
S. mansoni ova present in		3			2		
O. verimicularis ova present in		0			1		
Negative		32			28		
Urine. Total examined		71			125		
S. haematobium ova present in		18			31		
R.B.C. and Pus cells present in		16			17		
Negative		37			77		

		Number examind at (A).	Number examined at (B).
BLOOD FILMS (THIN) Total examined		152	188
P. vivax present in		14	18
P. falciparum present in		28	19
S. duttoni present in		1	0
Negative		109	151
SPLEEN. Total examined under 15 years		=88	=87
Degree of enlargement in finger's breadth below costal margin	One finger	19	21
	Two fingers	10	15
	Three fingers	3	4
	Not palpable	56	47
DENTITION			
Good		129	29
Fair		13	21
Bad		10	21

Latrines are not used at either of these villages. Examination of the surrounding bush revealed many deposits of dejecta. It is difficult to account for the considerably higher incidence of ascariasis (47.5 per cent. as compared with 15 per cent.) at Milonde village, as conditions, habits and general environment do not differ to any extent from those at Ntenjera village.

SUMMARY OF MEDICAL SURVEY OF RESIDENTS OF EIGHT VILLAGES SITUATED ON THE LAKE SHORE, FORT JOHNSTON DISTRICT, 1934.

The total population of the eight villages numbered about 2,300.

The procedure adopted in each village was as follows:—

(i) The treatment of individuals complaining of disease. Where operation was necessary this was performed under local anaesthesia and a collodion dressing applied to seal the wound.

(ii) 100 blood slides were taken from children.

(iii) All children were examined for splenic enlargement.

1,411 cases were treated, the principal diseases being bronchitis or bronchial catarrh 336, conjunctivitis 136, constipation 210, scabies 142, schistosomiasis 70, gonorrhoea 23 and syphilis 17.

Twenty-two minor operations were performed and eight cases requiring major operations were sent to Fort Johnston Native Hospital. Only one case of febrile malaria was found during the course of the Survey.

Microscopic investigation of blood films.

Number examined	800.
Nkudzi Village	64 per cent. positive
Kasanga ,,	57 ,,
Nankumba ,,	57 ,,
Malembo ,,	57 ,,
Old Livingstonia Village	53 ,,
Fort Maguire ,,	63 ,,
Mantola ,,	63 ,,
Monkey Bay ,,	51 ,,

All parasites were of the Sub-tertian variety.

ENLARGEMENT OF THE SPLEEN.

Village.	Number of children examined.	Degree of enlargement in finger's breadth.			
		One	Two	Three	Four
Nkudzi	117	27	17	8	7
Kasanga Nankumba Malembo	177	37	53	18	12
Old Livingstonia	157	24	37	2	9
Fort Maguire Mantola	132	—	51	8	4
Monkey Bay	97	27	7	7	2
Total	780	115	165	43	34

SUMMARY OF MEDICAL SURVEY OF THE INHABITANTS OF MANGOZI VILLAGE, CHOLO DISTRICT, 1934.

The village of Mangozi consists of about 50 huts with a population of 113 adults (males 45 females 68) and 104 children.

The immediate vicinity of the huts was clean but collections of unburied refuse on the outskirts of the village provided breeding places for flies.

Twenty of the huts were equipped with pit latrines, each about 12 feet in depth, fitted with properly constructed tops. Stool examination revealed a high degree of helminthic infestation, namely 83.36 per cent. of the children and 100 per cent, of the adults; it would appear that few—if any—make use of the latrines facilities available.

	Number of children examined 104	Number of adults examined 113
Average Hb per cent. (Tallquist's scale) ...	60 per cent.	65 per cent.
FAECES		
Hookworm ova ...	Present in 40	Present in 50
Ascaris ova ...	,, ,, 11	,, ,, 3
Hookworm and ascaris ova	,, ,, 33	,, ,, 46
Hookworm and *S. mansoni* ova ...	,, ,, 1	,, ,, 8
Hookworm, *S. mansoni* and ascaris ova ...	,, ,, 1	,, ,, 6
Tape Worm ...	,, ,, 1	—
Negative ...	17	—
URINE.		
S. Haematobium ...	Positive 22	Positive 51
	Negative 82	Negative 62
LIVER.	Normal 88	Normal 94
	Enlarged 16	Enlarged 19

	Number of childred examined 104		Number of adults examined 113	
SPLEEN ...	Normal	53	Normal	84
Degree of enlargement in finger's breadth below costal margin ...	Palpable	3	Palpable	5
	One finger	23	One finger	16
	Two fingers	17	Two fingers	6
	Three fingers	7	Three fingers	2
	To umbilicus	1	—	
HEART ...	Normal	102	Normal	109
	Irregular Rhythm	2	Irregular Rhythm	4
TONSILS ...	Normal	74	Normal	81
	Enlarged	30	Enlarged	32
DENTITION ...	Good	97	Good	79
	Decayed	7	Decayed	34
EARS ...	Normal	99	Normal	102
	Otitis	5	Otitis	11
NUTRITION ...	Good	85	Good	76
	Fair	13	Fair	30
	Poor	6	Poor	7

BLOOD.

186 blood films were examined. Malaria parasites were found in 78, or 41.93 per cent.; 53 (28.49 per cent.) contained *P. falciparum* and 25 (13.44 per cent.) *P. vivax*.

SUMMARY OF RESULTS OF A MEDICAL SURVEY AT JEANES TRAINING SCHOOL, ZOMBA.

All new students with their wives and families were examined at the commencement of the November Term. Although the total number examined was small, viz, 93, there were representatives of every administrative district in the Protectorate.

The age distribution was as follows:

Age		Male		Female
Adult	...	23	...	23
11-15	...	3	...	1
6-10	...	7	...	7
0- 5	...	14	...	15

Blood slides were procured from all individuals at the time of examination, but a complete series of specimens of faeces and urine was not obtained owing to reluctance on the part of women and children to supply them.

	Adult.		11-15 years.	6-10 years.	0-5 years.
SPLEEN.	Palpable	19	3	4	5
Degree of enlargement in finger's breadth below costal margin	One finger	—	—	—	—
	Two fingers	1	—	3	7
	Three fingers	—	—	—	1
	To umbilicus	—	—	—	2
FAECES.					
Number examined 48					
Hookworm ova ...	Present in	17	—	Present in 2	Present in 1
E. histolytica cysts ...	,,	3	—	—	—
URINE.					
Number examined 48					
S. Haematobium ova ...	,,	9	—	Present in 1	—
BLOOD FILMS.					
Number examined 93					
Malaria parasites undefined	,,	10	Present in 1	,, 3	Present in 9
P. vivax ...	,,	2	—	,, 1	,, 1

20.8 per cent. of urines examined contained ovae of *S. haematobium*; 41.4 per cent. of the faeces contained hookworm ovae.

Physical examination revealed that 30 per cent. were suffering from some form of disease. Practically all the ailments were of a minor nature such as pyorrhoea, bronchial catarrh, conjunctivitis, dental caries and tinea; one case of mitral valvular disease was seen.

Treatment was instituted where necessary. The course of training at the Jeanes School lasts two years and during that period, this group of 93 individuals will be kept under constant observation. It will therefore be of interest to observe their state of health at the end of two years residence in surroundings superior to those to which they are accustomed in their own villages.

SUMMARY OF THE RESULTS OBTAINED DURING A MEDICAL SURVEY OF THE INHABITANTS OF NGONGO'S VILLAGE AND MWAWEMBE VILLAGE, KARONGA DISTRICT, 1934.

These two villages were selected in order that a comparison could be made of the results. Ngongo's village is situated—in the hills west of Karonga Township—at about 3,500 feet above sea level; Mwawembe village is sited on the shores of Lake Nyasa. Very different conditions prevail in these two localities. In the hills, the soil is less fertile, crops are not so abundant or varied; the temperature fluctuates widely throughout the year. Lack of good communications prohibits the sale of superfluous foodstuffs. Soil on the lake shore is rich, and without effort rice, millet, maize, cassava, pumpkins and bananas flourish. Fresh fish can be purchased cheaply and supplies of fresh meat, milk, chickens, eggs and beer are available throughout the year; the temperature is subject to little variation. Surplus crops can be disposed of for money and a higher standard of living is maintained. The people are, however, extremely apathetic, dirty and indolent, due, as examination demonstrates to the fact that the majority suffer from chronic ill health, malaria, hookworm, and schistosomiasis (rectal and urinary) being the chief causes. Their resistence being lowered by these debilitating conditions they are prone to succumb easily to intercurrent infection. Lake shore villagers showed physical superiority over hill residents in only one respect viz., dentition, due, no doubt, to their diet being on the whole a better balanced one.

		Number examined Ngongo's village.		Number examined Mwawembe Village.	
		Children under 10 years.	Adults	Children under 10 years.	Adults.
		9	44	2	47
Hb. estimated by Tallquist's scale					
	90%	—	12	—	—
	85%	—	1	—	1
	80%	6	9	—	6
	75%	—	2	—	—
	70%	3	12	1	20
	60%	—	7	—	13
	50%	—	1	1	5
	40%	—	—	—	1
	30%	—	—	—	1
		Number examined		Number examined	
FAECES.		9	44	3	45
Hookworm ova present in		0	5	0	22
Ascaris ova present in		0	2	0	0
E. histolytica & hookworm ova present in		0	1	0	0
S. mansoni present in		0	0	0	10
		Number examined		Number examined	
BLOOD.		9	41	2	45
P. vivax present in		0	0	0	2
P. falciparum present in		4	2	2	5
Malaria parasites-type undefined		0	0	1	0
		Number examined		Number examined	
SPLEEN.		9	42	3	47
Degree of enlargement in finger's breadth below costal margin	One finger	3	19	0	21
	Two fingers	3	3	0	11
	Three fingers	3	1	3	0
		Number examined		Number examined	
TONSILS		10	41	3	47
Enlarged		6	14	1	9
Injected		0	1	0	9
		Number examined		Number examined	
NUTRITION		10	44	3	47
Good		3	24	3	24
Fair		6	15	0	16
Poor		1	4	0	7
Emaciated		0	1	0	0

It is regretted that the number of children examined was so small as to be useless for making a comparison of the protozoal and helminthic infections.

Almost equal numbers of adults were seen. A comparison of the haemoglobin percentage and the infectivity rate of helminthic infection shows that the hill people examined have a higher average percentage of haemoglobin and suffer less from ankylostomiasis and *S. mansoni* infections.

	Ngongo's Village.		Mwawembe's Village.
Average percentage of haemoglobin	80.5	...	65.2
Percentage of infection with hookworm	11.4	...	48.8
Percentage of infection with *S. mansoni*	0	...	22.2

SECTION VII. PRISON AND ASYLUM.

CENTRAL PRISON, ZOMBA.

This prison is a well constructed brick building provided with a separate hospital block and isolation block for infectious diseases.

This Prison is regularly visited by a Medical Officer, a Sub-Assistant Surgeon is in sub-medical charge.

All prisoners on arrival are medically examined and specimens of faeces and urine are sent to the Laboratory for investigation.

The long term prisoners are drawn from every district in the Protectorate; on occasions tax defaulters are admitted in considerable numbers for short sentence.

In April 1934 it was decided, owing to the prevalence of 'amoebiasis' in Zomba to examine the stools not only of newly admitted prisoners but also of all inmates, with a view to determining the incidence—if any—of carriers of *E. histolytica.*

Specimens were obtained from 405 prisoners. The vegetative form of *E. histolytica* was found in one specimen only, but cysts of *E. histolytica* were present in forty.

In a certain batch of newly admitted prisoners all from the same district, cysts were found in 15 cases.

These carriers must be considered as a real danger not only to the population of the Prison but also to the population of Zomba.

All cases received treatment.

During the year there were 509 new admission (including Asiatics) to the Prison, a large increase over the figure for the previous year.

The following table gives the sick rate statistics:—

	1929	1930	1931	1932	1933	1934
Number admitted to prison ...	206	228	219	239	413	509
Daily average in prison ...	296	302	332	257	355.17	510.9
Number admitted to hospital ...	380	579	661	534	480	524
Daily average in hospital ...	24.2	34.4	40	36.3	34.68	35.34
Percentage in hospital ...	8	11.4	12	10.1	9.5	6.92

Twelve deaths occurred during the year:—

Malaria, aestivo-autumnal	...	...	...	1.
Valvular disease of the heart	...	...	...	1.
Lobar-pneumonia	...	...	...	9.
Hernia	...	...	...	1.

A record of the weights of 107 prisoners who have been detained in prison for 2 years and over showed that, 80.37 per cent. had gained weight, 11.22 per cent. lost weight and 8.41 per cent. remained constant.

The main institutional diseases were:—

Lobar-pneumonia	...	...	...	26 cases.
Influenza	...	...	..	99 cases.
Malaria	...	...	...	109 cases.

The health of the prisoners on the whole may be said to be satisfactory.

ASYLUM.

There is only one Asylum for the whole country, this institution is administered by the Chief Inspector of Asylums who is also Commissioner of Police.

The establishment consists of a European Superintendent who is also in charge of the Prison. He has, of course, no special knowledge of the care of mental patients and has received no hospital training.

From a medical point of veiw the Asylum is visited by a Medical Officer and a Sub-Assistant Surgeon is in sub-medical charge. For those patients who are physically sick, a separate portion of the building is reserved.

One death occurred during the year from Thrombosis.

The total number of inmates on 31st December, 1934 was 79 males and 14 females. Comparative figures are :—

	1933		1934
Daily average number of lunatics	80.04	...	90.79

Towards the close of the year a medical survey of the inmates of the Asylum was attempted, but was only only partially performed owing to the transfer of the Medical Officer undertaking the work.

Such a survey is very urgently required in view of the nature and control of the institution, it is hoped that during 1935 it may be possible to carry out a complete medical survey.

Eleven cases of dysentery occurred during the year and it was interesting to find that of the 97 patients examined, nine of them were discovered to be carriers of *E. histolytica.*

Although the patients are kindly treated and adequately fed by the Superintendent, yet it cannot be said that this institution functions as a Mental Hospital; it remains, unfortunately, as a place of restraint for the mentally afflicted, under present conditions little medical treatment is possible and no hospital facilities, as such, exist.

Recommendations with regard to this Asylum are made in the appropriate part of this Report, (Section III, D.).

Returns.

TABLE I. STAFF.

EUROPEAN.

A. D. J. B. Williams, O.B.E.	Director of Medical Services.
H. H. B. Follit	Senior Health Officer.
W. A. S. Lamborn, O.B.E.	Medical Entomologist.
R. Calleja	Senior Medical Officer.
H. M. Shelley	Pathologist.
H. G. FitzMaurice	Medical Officer.
T. A. Austin	,, ,,
W. H. Watson	,, ,,
W. L. Gopsill	, ,,
P. P. Martyn	,, ,,
F. O. W. A. Mahon-Daly	,, ,,
L. C. Mayne	,, ,,
P. J. Bourke	,, ,,
R. N. Wilcox	,, ,,
E. J. Blackaby	,, ,,
H. D. Cronyn	,, ,,
Miss I. M. M. Aitken	,, ,, (Resigned 19. 1. 1934)
D. P. Turner	,, ,,
C. H. Howat	,, ,,
R. A. Newsom	,, ,,
Miss K. R. Cameron, M.B.E.	Matron.
Miss N. M. Cremen, M.B.E.	Nursing Sister.
Miss H. M. Phillips	,, ,,
Mrs. N. K. Clemence	,, ,,
Miss M. E. S. Cumming	,, ,,
Miss J. H. Marr	,, ,, Transferred to Gold Coast 26. 9. 1349.
Miss H. C. Potter	,, ,,
Miss K. R. Ault	,, ,, Resigned 20. 1. 1934.
Miss A. Munro	,, ,, Transferred to Hong Kong 10. 3. 1934.
Miss S. Johnson	,, ,,
Miss I. A. Frame	,, ,, Died 23. 5. 1934.
Miss E. F. McConachy	,, ,,
Miss B. Wells	,, ,, Appointed 15. 3. 1934.
Miss E. M. R. D. Davies	,, ,, ,, 21. 6. 1934.
Miss F. McQuire	,, ,, ,, 27. 9. 1934.
R. W. G. Pegg	Clerk and Medical Storekeeper.
V. T. Smithyman	Junior Clerk (Temporary).
W. A. Willox	Sanitary Superintendent.
F. E. Weaver	,, ,,
F. L. Chapman	,, ,, (Temporary).

Asiatic.

B. T. Lele	Civil Sub-Assistant Surgeon.
Lakhpat Singh	,, ,, ,, ,,
S. S. Kokari	,, ,, ,, ,,
G. D. Kashap	Subadar. I. M. D. Sub-Assistant Surgeon.
B. Prasad	Jemadar ,, ,, ,, ,,
Siraj-ul-Haq Khan	Jemadar ,, ,, ,, ,, Reverted to military duties 27. 10. 1934.
R. L. Datta	Jemadar I. M. D. Sub-Assistant Surgeon.
Dalip Singh	,, ,, ,, ,, ,,
Bansi Lal	,, ,, ,, ,, ,,
P. D. Jhala	Temporary Sub-Assistant Surgeon. Appointed 25. 7. 1934.

African. (Principal Members).

*T. D Duncan	Senior Hospital Assistant.
*Leonard Makolera	Hospital Assistant.
Moses Kaunde	,, ,,
*Godwin Maulidi	,, ,,
Elliott Taumbe	,, ,,
Leonard Mphamba	,, ,,
E. G. Hoare	,, ,,
Dyson David	,, ,,
*Fred Nyirenda	,, ,,
Harry Thomson	,, ,,
Radford Botha	,, ,,
Rabson German	Laboratory Assistant
Lawrence M'Manga	Clerk Grade 1.
Isaiah M. Jere	,, ,, 1.
Austin Maosa	,, ,, 1.
MacAuslin Chemboga	Sanitary Inspector Grade 1.

*Passed examination for Senior Hospital Assistant.

TABLE II.—FINANCIAL.

(See Section I C.)

TABLE III.

Return of Statistics of Population for the Year 1934.

	Europeans.	Africans.	Asiatics.
Number of Inhabitants 1934	1,800	1,600,713	1,401
Number of Births 1934	40	(Not Known)	48
Number of Deaths 1934	13	-do-	16
Number of Immigrants 1934	—	-do-	—
Number of Inhabitants 1933	1,817	1,608,023	1,474
Increase			
Decrease	17	7,310	73

TABLE IV.

SHOWING THE MAXIMUM, MINIMUM, AND MEAN TEMPERATURES (FAHR.) AND TOTAL RAINFALL IN VARIOUS DISTRICTS DURING THE YEAR 1934.

Station	Height above Sea Level	Air Temperature					Rain.		
		Means of		Means of	Absolute		Number of Days	Total Fall Inches	Maximum Fall in a Day
		A Max.	B Min.	A & B	Max.	Min.			Inches
Port Herald ...	130	89.3	69.7	79.5	108	53	91	33.88	2.27
Chikwawa ...	127	87.8	67.6	77.7	110	40	62	27.83	2.65
Cholo ...	3,000	80.5	60.2	70.4	99	47	121	59.14	3.97
Mlanje ...	2,400	81.9	62.8	72.4	95	52	105	81.13	3.72
Blantyre ...	3,000	78.5	60.7	69.6	90	47	90	58.40	4.37
Zomba ...	3,020	79.5	61.8	70.7	93	47	142	48.97	2.75
Liwonde ...	1,600	86.6	48.9	67.8	97	30	72	35.41	2.10
Ncheu ...	3,700	70.7	60.6	65.6	96	47	109	49.03	2.85
Fort Johnston ...	1,700	86.6	66.5	76.6	104	50	84	37.03	2.36
Dedza ...	5,250	71.5	53.1	62.3	85	41	92	14.66	2.80
Lilongwe ...	3,400	78.0	51.1	64.6	90	37	76	46.29	2.27
Dowa ...	4,400	74.5	62.0	68.7	92	43	76	44.16	3.60
Kota Kota ...	1,800	87.0	77.9	82.5	102	42	121	69.34	3.57
Kasungu ...	3,500	90.3	54.5	72.4	106	38	70	44.51	2.95
Mzimba ...	4,500	78.2	59.0	68.6	89	46	71	33.89	2.53
Chinteche ...	1,800	84.4	61.5	73.0	100	43	117	87.44	5.73
Karonga ...	1,800	90.6	69.5	80.1	103	60	79	52.60	3.11

TABLE V.

TABLE Va.—ZOMBA AND BLANTYRE EUROPEAN HOSPITALS.

RETURN OF DISEASES AND DEATHS (EUROPEAN IN-PATIENTS) FOR THE YEAR 1934.

Diseases.	Remaining at the end of 1933	Admissions during 1934.		Total Cases Treated.	Deaths.	Remaining at the end of 1934
		Zomba.	Blantyre.			
I. *Epidemic, Endemic and Infectious Diseases*:						
1. Enteric group:—						
Paratyphoid A. ..	1	—	—	1	—	—
Type not defined ...	—	1	—	1	—	—
4. Undulant fever ...	—	—	3	3	—	—
5. Malaria:—						
Tertian (benign) ...	—	5	3	8	—	—
Aestivo-autumnal ...	—	6	—	6	1	1
Blackwater fever ...	—	1	1	2	1	—
Type not defined ...	—	7	12	19	—	—
11. Influenza ...	—	—	1	1	—	—
16. Dysentery:—						
Amoebic ...	1	21	4	26	—	3
Undefined or due to other causes ...	—	—	2	2	—	—
31. Tuberculosis, pulmonary and laryngeal ...	—	—	1	1	—	—
II. *General Diseases not mentioned above*:						—
66. Alcoholism ...	—	2	—	2	—	1
III. *Affections of the Nervous System and Organs of the Senses*:						
70. Encephalitis (not including encephalitis lethargica) ...	—	2	—	2	—	—
74. Apoplexy:—						
Haemorrhage ...	—	—	1	1	—	—
77. Other forms of mental alienation:—						
Confusional insanity ...	—	—	1	1	—	—
Carried forward	2	45	29	76	2	5

TABLE Va.—Continued.

Diseases.	Remaining at the end of 1933	Admissions during 1934.		Total Cases Treated.	Deaths.	Remaining at the end of 1934
		Zomba.	Blantyre.			
Brought forward ...	2	45	29	76	2	5
82. A. Hysteria ...	—	—	1	1	—	—
Neuritis ..	—	1	—	1	—	—
Neurasthenia	—	—	1	1	—	—
85. Diseases of the eye and annexa	—	1	—	1	—	—
86. Affections of the ear and mastoid sinus ...	—	1	1	2	—	—
IV. *Diseases of the Circulatory System* :						
88. Acute endocarditis ...	1	—	—	1	—	—
90. Other diseases of the heart :—						
Myocarditis ...	—	—	2	2	—	—
93. Diseases of the veins :—						
Haemorrhoids ...	—	1	1	2	—	—
94. Diseases of the lymphatic system.						
Lymphadenitis ...	—	—	1	1	—	—
V. *Diseases of the Respiratory System* :						
99. Bronchitis :—						
Acute ...	—	3	1	4	—	—
Chronic ...	—	3	—	3	—	—
100. Broncho-pneumonia ...	—	—	1	1	—	—
101. Pneumonia :—						
Lobar	—	—	2	2	—	—
105. Asthma ...	—	1	—	1	—	—
VI. *Diseases of the Digestive System* :						
108 A. Diseases of the buccal cavity and annexa :—						
Dental caries ...	—	—	4	4	—	—
109. Affections of the pharynx and tonsils :—						
Vincent's angina ...	—	1	1	2	—	—
Tonsillitis ...	—	4	1	5	—	—
111. A. Ulcer of the stomach ...	—	1	—	1	—	—
112. Other affections of the stomach—						
Gastritis ...	—	2	—	2	—	—
114. Diarrhoea and enteritis :—						
Two years and over ..	—	—	1	1	—	1
Colitis ...	—	—	1	1	—	—
117. Appendicitis ...	—	4	—	4	—	—
119. A. Affections of the anus :—						
Fistula ...	—	—	1	1	—	—
122. Cirrhosis of the liver :—						
Alcoholic ...	—	1	—	1	—	—
123. Biliary calculus ...	—	1	—	1	—	—
124. Other affections of the liver :—						
Hepatitis ...	—	1	3	4	—	—
Cholecystitis ...	—	—	1	1	—	—
Jaundice ...	—	—	1	1	—	—
VII. *Diseases of the Genito-urinary System* : (*non-venereal* :)						
129. Chronic nephritis ...	—	—	1	1	1	—
131. Other affections of the kidneys :—						
Pyelitis ...	1	1	4	6	—	—
132. Urinary calculus ...	—	—	2	2	—	—
133. Diseases of the bladder :—						
Cystitis .	—	2	—	2	—	—
Carried forward ...	4	74	61	139	3	6

TABLE Va.—Continued.

Diseases.	Remaining at the end of 1933	Admissions during 1934.		Total Cases Treated.	Deaths.	Remaining at the end of 1934
		Zomba	Blantyre			
Brought forward	4	74	61	139	3	6
134. Diseases of the urethra :—						
Abscess ...	—	—	1	1	—	—
141. B. Other affections of the female genital organs :—						
Displacements of the uterus ...	—	—	1	1	—	—
Leucorrhoea ...	—	1	—	1	—	—
142. Diseases of the breast (non-puerperal) :—						
Mastitis ...	—	1	—	1	—	—
VIII. *Puerperal State* :						
143. A. Normal labour ..	1	2	13	16	—	—
148. Puerperal toxaemia ...	—	—	2	2	—	—
149. Sequelae of labour ...	—	—	1	1	—	—
IX. *Affections of the Skin and Cellular Tissues* :						
152. Boil ...	—	1	—	1		—
Carbuncle ...	—	2	1	3		—
153. Abscess ...	—	—	1	1		—
Cellulitis ...	—	2	1	3		—
155. Other diseases of the skin :—						
Erythema ...	—	1	—	1	—	—
Herpes ...	—	—	1	1		—
X. *Diseases of Bones and Organs of Locomotion* (*non-tuberculous*):						
156. Diseases of bones :—						
Periostitis ...	—	—	1	1	—	1
XIV. *Affections produced by External Causes* :						
166. Poisoning ...	—	—	1	1	—	—
175. Food poisoning	—	1	—	1	—	—
184. Wounds (by cutting or stabbing instruments) ...	—	—	1	1	—	—
185. Wounds (by fall) ..	—	2	—	2	—	—
201 A.—Dislocation ...	—	—	1	1	—	—
B.—Sprain ...	—	1	—	1	—	—
C.—Fracture ...	—	3	1	4	—	1
202. Other external injuries :						
Concussion ...	—	1	—	1	—	—
Foreign body ...	—	—	1	1	—	—
Unclassified ...	—	—	1	1	—	—
XV. *Ill-defined Diseases* :						
205 A.—Diseases not already specified or ill-defined :—						
Pyrexia of uncertain origin ...	—	1	—	1	—	—
Total ...	5	93	90	188	3	8

TABLE V.

Table Vb. Return of Diseases and Deaths (Native In-Patients) for the Year 1934.

(Including Asiatics, Native officals, K. A. R. Native Ranks, Native General Population, Asiatic and Native convicts).

Diseases.	Remaining at the end of 1933	Admissions during 1934	Total Cases Treated	Deaths.	Remaining at the end of 1934.
I. *Epidemic, Endemic and Infectious Diseases :*					
1. Enteric Group :—					
Type not defined ...	—	5	5	3	—
3. Relapsing fever ...	4	112	116	2	1
5. Malaria :—Tertian (benign) ...	14	258	272	1	—
Quartan ...	1	13	14	—	—
Aestivo-autumnal ...	1	199	200	5	9
Cachexia	—	12	12	—	—
Blackwater fever ...	—	4	4	—	—
Type not defined ...	7	216	223	7	8
6. Smallpox ...	3	4	7	—	1
7. Measles ...	—	18	18	1	2
9. Whooping cough ...	—	7	7	—	1
11. Influenza ...	2	319	321	3	4
13. Mumps ...	1	5	6	—	—
16. Dysentery :—Amoebic ..	5	136	141	1	10
Bacillary ...	1	14	15	1	—
Undefined ..	1	14	15	2	1
20. Leprosy ..	6	60	66	—	14
24. Epidemic cerebro-spinal fever ..	—	1	1	1	—
25. Other epidemic diseases :—Chickenpox ...	1	11	12	—	—
Yaws ...	5	107	112	—	5
Trypanosomiasis. .	2	5	7	—	1
29. Tetanus ...	—	1	1	—	—
30. Mycosis ...	—	3	3	1	—
31. Tuberculosis, pulmonary and laryngeal ...	2	73	75	8	3
32. Tuberculosis of the meninges or central nervous system ...	—	1	1	1	—
33. Tuberculosis of the intestines or peritoneum ...	—	2	2	—	—
34. Tuberculosis of the vertebral column ...	—	16	16	—	1
35. Tuberculosis of bones and joints ...	1	25	26	1	2
36. Tuberculosis of other organs :—					
Skin ...	—	2	2	—	1
Lymphatic system ...	—	16	16	—	—
Genito-urinary system ...	—	1	1	—	1
38. Syphilis :—Primary ...	16	218	234	1	12
Secondary ...	29	334	363	1	25
Tertiary ...	—	40	40	—	4
Hereditary ..	—	24	24	2	1
Period undefined ...	1	12	13	—	2
39. Soft chancre ..	—	4	4	—	—
40. A. Gonorrhoea and its complications ..	28	211	239	—	12
B. Gonorrhoeal ophthalmia ..	—	1	1	—	1
C. ,, arthritis ...	—	7	7	—	2
41. Septicaemia ...	—	3	3	2	—
42. Other infectious diseases :—Filariasis ...	—	1	1	—	—
Onchocerciasis ...	—	16	16	—	—
Unclassified ...	—	5	5	—	5
II. *General Diseases not mentioned above :*					
43. Cancer or other malignant tumours of the buccal cavity ...	—	2	2	—	—
44. Cancer or other malignant tumours of the stomach or liver ...	—	4	4	—	—
45. Cancer or other malignant tumours of the intestines ..	2	—	2	1	—
46. Cancer or other malignant tumours of the female genital organs	1	2	3	—	—
48. Cancer or other malignant tumours of the skin ...	—	4	4	—	—
Carried forward	134	2,548	2,682	45	129

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1933	Admissions during 1934.	Total Cases Treated	Deaths	Remaining at the end of 1934.
Brought forward	134	2,548	2,682	45	129
49. Cancer or other malignant tumours of organs not specified ...	1	8	9	1	—
50. Tumours (non-malignant)					
Adenoma ...	—	4	4	—	—
Lipoma ...	—	7	7	—	—
Cyst ...	—	2	2	—	—
Dermoid cyst ...	—	3	3	—	—
Osteoma ...	—	2	2	—	—
Papilloma ...	—	1	1	—	—
Fibroma ...	—	2	2	—	—
Sebaceous cyst ...	—	1	1	—	—
Unclassified ...	—	62	62	—	5
51. Acute rheumatism ...	1	6	7	—	—
52. Chronic rheumatism ...	1	49	50	—	2
54. Pellagra ...	—	18	18	—	4
55. Beriberi ...	—	1	1	1	—
57. Diabetes ...	—	1	1	—	—
58. Anaemia :—Other anaemias ...	—	6	6	—	—
60. Diseases of the thyroid gland :—					
Other diseases of the thyroid gland ..	—	3	3	—	—
64. Diseases of the spleen ...	—	3	3	—	—
65. Leukaemia ...	—	1	1	—	1
Hodgkin's disease ...	—	1	1	—	—
III. *Affections of the Nervous System and Organs of the Senses*:					
70. Encephalitis (not including encephalitis lethargica)	—	2	2	—	—
71 Meningitis (not including tuberculous or cerebro-spinal) ...	—	1	1	1	—
73. Other diseases of the spinal cord ...	—	1	1	—	—
74. Apoplexy :—Haemorrhage ...	—	3	3	2	—
Thrombosis ...	—	1	1	—	—
75. Paralysis :—Hemiplegia ...	2	11	13	—	1
Other paralyses ...	1	15	16	1	—
76. General paralysis of the insane ...	—	3	3	—	1
77. Other forms of mental alienation :—					
Dementia ...	—	1	1	—	—
Mania ...	—	3	3	—	—
Unclassified ...	1	11	12	—	2
78. Epilepsy	1	46	47	1	3
82. Hysteria ...	—	1	1	—	—
Neuritis ...	—	6	6	—	—
Migraine ...	—	1	1	—	—
Neuralgia ...	2	15	17	—	—
Sciatica ...	—	1	1	—	—
84. Other affections of the nervous system ...	—	2	2	—	—
85. Diseases of the eye and annexa :—					
Cataract ...	—	7	7	—	1
Conjunctivitis ...	3	192	195	—	6
Trachoma ...	1	2	3	—	—
Foreign body ...	—	3	3	—	—
Ulcer of cornea ...	—	20	20	—	1
Unclassified ...	4	81	85	—	5
86. Affections of the ear and mastoid sinus ...	1	35	36	—	1
IV. *Diseases of the Circulatory System*:					
87. Pericarditis ...	1	1	2	—	—
88. Acute endocarditis ...	—	2	2	1	—
89. Angina pectoris ...	—	3	3	—	—
90. Other diseases of the heart :—					
Valvular ...	1	22	23	3	1
Myocarditis ...	—	3	3	—	—
Disordered action ...	1	12	13	2	—
Carried forward	156	3,236	3,392	58	163

TABLE Vb—Continued.

Diseases.	Remaining at the end of 1933	Admissions during 1934.	Total Cases Treated	Deaths.	Remaining at the end of 1934
Brought forward	156	3,236	3,392	58	163
91. Diseases of the arteries :—Aneurysm ...	—	1	1	—	—
93. Diseases of the veins :—					
Haemorrhoids ...	—	6	6	—	—
Varicose veins	—	7	7	—	—
Phlebitis ...	—	1	1	—	—
94. Diseases of the lymphatic system :—					
Lymphangitis ...	—	7	7	—	—
Lymphadenitis (non-specific) ...	—	18	18	—	—
25. Haemorrhage of undetermined cause :—				—	—
Epistaxis ...	—	1	1	—	—
V. *Affections of the Respiratory System* :					
97. Diseases of the nasal passages :—					
Polypus ...	1	1	2	—	—
Rhinitis ...	—	1	1	—	—
Coryza ...	—	30	30	—	—
Sinusitis ...	—	2	2	—	—
98. Affections of the larynx :—					
Laryngitis ...	—	2	2	—	—
Oedema of the larynx ...	—	1	1	1	—
99. Bronchitis :—Acute ...	2	107	109	2	1
Chronic ...	—	23	23	—	—
100. Broncho-pneumonia ...	1	72	73	13	1
101. Pneumonia :—Lobar	3	114	117	19	4
Unclassified ...	—	17	17	4	—
102. Pleurisy ...	1	31	32	1	—
Empyema ...	1	2	3	—	—
103. Congestion of the lungs ...	—	1	1	—	—
Infarction of the lungs ...	—	1	1	1	—
105. Asthma ...	3	34	37	—	—
106. Pulmonary emphysema ...	—	2	2	—	—
107. Other affections of the lungs :—					
Unclassified ...	—	2	2	1	—
VI. *Diseases of the Digestive System :*					
108. A. Diseases of the buccal cavity and annexa :—					
Dental caries ...	2	6	8	—	—
Alveolar abscess ...	—	3	3	—	—
Gingivitis ...	—	4	4	—	—
B. Other affections of the mouth :—					
Stomatitis ...	—	7	7	3	1
Glossitis ...	—	1	1	—	—
109. Affections of the pharynx and tonsils :—					
Pharyngitis ...	—	6	6	—	1
Tonsillitis ...	—	49	49	—	2
110. Affections of the oesophagus ...	—	1	1	—	—
112. Other affections of the stomach :—					
Gastritis ...	1	6	7	—	—
Dyspepsia ...	—	11	11	—	1
113. Diarrhoea and enteritis :—					
Under two years ...	2	11	13	1	1
114. Diarrhoea and enteritis :—					
Two years and over ...	2	42	44	—	—
Colic ...	—	4	4	—	—
Colitis ...	—	22	22	1	—
115. Ankylostomiasis	28	566	594	11	34
116. Diseases due to intestinal parasites :—					
Cestoda (taenia) ...	—	5	5	1	—
Nematoda (other than ankylostoma) :—					
Ascaris ...	2	39	41	—	—
Strongylus ...	—	1	1	—	—
Unclassified ...	—	1	1	—	—
Carried forward	205	4,505	4,710	117	209

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1933	Admissions during 1934	Total Cases Treated	Deaths	Remaining at the end of 1934.
Brought forward	205	4,505	4,710	117	209
117. Appendicitis ...	—	11	11	1	—
118. A. Hernia :—Femoral	—	1	1	—	1
Inguinal ...	—	36	36	2	1
B. Intestinal obstruction ...	—	1	1	1	—
119. A. Affections of the anus :—					
Fistula ...	1	10	11	—	2
Prolapse ...	—	5	5	—	2
B. Other affections of the intestines :—					
Constipation ...	—	74	74	—	—
Unclassified ...	1	3	4	1	—
121. Hydatid of the liver ...	—	1	1	—	—
122. Cirrhosis of the liver :—					
Alcoholic ...	—	2	2	—	—
Other forms ...	—	5	5	4	—
124. Other affections of the liver: —					
Abscess ...	—	7	7	2	—
Hepatitis ...	—	6	6	—	1
Cholecystitis ..	—	1	1	—	—
Jaundice ...	1	10	11	—	1
126. Peritonitis (of unknown cause) ...	—	4	4	1	—
127. Other affections of the digestive system :—					
Unclassified ...	—	1	1	—	—
VII *Diseases of the Genito-urinary System (non-venereal).*					
128. Acute nephritis ...	2	11	13	2	2
129. Chronic nephritis ...	—	6	6	—	—
130. B. Schistosomiasis ...	22	359	381	2	13
131. Other affections of the kidneys :—Pyelitis ...	—	5	5	—	—
Perinephric abscess ...	—	1	1	—	1
132. Urinary calculus ...	1	3	4	—	—
Renal colic ...	—	1	1	—	—
133. Diseases of the bladder :—Cystitis ...	2	11	13	1	—
Incontinence of urine ...	—	1	1	—	—
Retention of urine ...	—	2	2	—	—
134. Diseases of the urethra :—Fistula ...	—	5	5	—	—
Extravasation of urine ...	—	1	1	1	—
Unclassified ...	—	2	2	—	—
135. Diseases of the prostate :—Hypertrophy ...	—	5	5	1	—
Prostatitis ...	—	6	6	1	2
136. Diseases (non-venereal) of the genital organs of man :—Epididymitis ...	1	8	9	—	—
Orchitis ...	—	6	6	—	—
Hydrocele ...	—	61	61	1	2
Ulcer of penis ...	—	12	12	—	1
Phimosis ...	—	6	6	—	—
Para-phimosis	—	2	2	—	—
Haematocele ...	—	2	2	—	—
138. Salpingitis ...	1	13	14	—	1
139. Uterine tumours (non-malignant) ...	—	1	1	—	—
141. A. Metritis ...	—	5	5	—	—
B. Other affections of the female genital organs :—					
Displacements of the uterus	—	2	2	—	—
Amenorrhoea ...	—	2	2	—	1
Dysmenorrhoea ...	—	8	8	—	—
Prolapse ...	—	1	1	—	—
Unclassified ...	—	8	8	—	—
142. Diseases of the breast (non-puerperal) :—					
Mastitis ...	—	5	5	—	1
Abscess of breast ...	—	12	12	—	1
Unclassified ...	1	2	3	—	—
Carried forward	238	5,258	5,496	138	242

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1933	Admissions during 1934.	Total Cases Treated.	Deaths.	Remaining at the end of 1934
Brought forward	238	5,258	5,496	138	242
VIII. *Puerperal State*:					
143. A. Normal labour ...	—	50	50	1	—
B. Accidents of pregnancy :—Abortion ...	—	10	10	—	—
Other accidents of pregnancy ...	—	6	6	1	—
144. Retained placenta ...	—	1	1	—	—
145. Other accidents of parturition ...	1	18	19	3	—
146. Puerperal septicaemia ...	—	4	4	1	—
147. Embolism ...	—	1	1	1	—
150. Puerperal affections of the breast ...	—	1	1	1	—
IX. *Affections of the Skin and Cellular Tissues*:					
151. Gangrene ...	—	15	15	2	—
152. Boil ...	—	19	19	—	—
Carbuncle ...	—	11	11	—	1
153. Abscess ..	8	216	224	1	7
Whitlow ...	1	47	48	—	—
Cellulitis ...	6	88	94	—	9
154. A. Tinea ...	3	9	12	—	—
B. Scabies ...	7	410	417	—	23
155. Other diseases of the skin :—Erythema ...	—	3	3	—	—
Urticaria ...	—	5	5	—	—
Eczema ...	1	50	51	—	3
Herpes ...	—	5	5	—	—
Psoriasis ...	—	1	1	—	—
Elephantiasis ...	3	6	9	—	2
Chiggers ...	—	29	29	—	1
Dermatitis ...	—	22	22	—	—
Impetigo ...	—	20	20	—	—
Ulcers ...	56	903	959	4	43
Unclassified ...	1	1	2	—	—
X. *Diseases of Bones and Organs of Locomotion: (non-tuberculous).*					
156. Diseases of bones :—					
Osteitis ...	2	10	12	—	2
Periostitis ...	—	12	12	—	1
Osteomyelitis ...	4	13	17	—	1
157. Diseases of joints :—Arthritis ...	2	19	21	1	1
Synovitis ...	2	27	29	—	1
158. Other diseases of bones or organs of locomotion :—					
Bursitis ...	—	2	2	—	—
Ganglion ...	—	2	2	—	—
Lumbago ...	2	34	36	—	1
Myalgia ...	3	72	75	—	5
Tenosynovitis ...	—	3	3	—	1
Unclassified ...	1	7	8	—	—
XI. *Malformations*:					
159. Hydrocephalus ...	—	1	1	—	—
Undescended testicle ...	—	1	1	—	—
Unclassified ...	—	1	1	—	—
XII. *Diseases of Early Infancy*:					
160. Congenital debility ...	2	6	8	2	—
161. Injury at birth ...	—	1	1	—	—
XIII. *Affections of Old Age*:					
164. Senility ...	—	3	3	—	—
XIV. *Affections produced by External Causes*:					
175. Food poisoning ...	—	4	4	—	—
Carried forward	343	7,427	7,770	156	344

TABLE Vb.—Continued.

Diseases	Remaining at the end of 1933	Admissions during 1934	Total Cases Treated	Deaths	Remaining at the end of 1934
Brought forward	343	7,427	7,770	156	344
176. Attacks of poisonous animals :—					
Snake-bite ...	3	30	33	—	3
Insect-bite ...	—	4	4	—	—
177. Other accidental poisonings ...	—	1	1	—	—
178. Burns (by fire) ...	12	164	176	15	16
179. Burns (other than by fire) ...	3	17	20	2	1
183. Wounds by firearms (war excepted) ..	—	1	1	—	—
184. Wounds (by cutting or stabbing instruments) ...	3	282	285	5	13
185. Wounds (by fall) ...	6	174	180	—	5
187. Wounds (by machinery) ...	—	2	2	—	—
188. Wounds (by crushing) ...	—	2	2	—	—
189. Wounds inflicted by animals, bites, kicks, etc.	4	106	110	5	4
199. Murder by other means ...	—	1	1	1	—
201. A. Dislocation ...	1	17	18	—	—
B. Sprain ...	1	37	38	—	1
C. Fracture ...	12	123	135	9	15
202. Other external injuries :—					
Concussion ...	—	4	4	1	—
Bruises ...	1	57	58	—	4
Foreign body (except eye) ...	—	4	4	—	—
Abrasions ...	2	44	46	—	3
Unclassified ...	1	44	45	—	1
XV. *Ill-defined Diseases* :					
205. A. Diseases not already specified or ill-defined :—					
Ascites	2	16	18	3	—
Oedema ...	1	8	9	—	—
Asthenia or debility ...	2	52	54	2	1
Shock ...	—	1	1	1	—
Headache ...	—	11	11	—	—
Pyrexia of unknown origin ...	—	8	8	—	—
Diseases not diagnosed ...	—	3	3	—	1
B Malingering ...	—	6	6	—	—
Malnutrition ...	—	1	1	—	1
TOTAL ...	397	8,647	9,044	200	413

TABLE VI.

TABLE VIa.—RETURN OF DISEASES (EUROPEAN OUT-PATIENTS,) FOR THE YEAR 1934

Diseases.	M.	F.
I. *Epidemic, Endemic and Infectious Diseases:*		
1. Enteric group:—		
Type not defined	—	1
4. Undulant fever	1	1
5. Malaria:—		
Tertian (benign)	22	6
Quartan	1	—
Aestivo-autumnal	56	34
Cachexia	4	1
Blackwater fever	4	1
Undefined	90	30
7. Measles	1	—
10. Diphtheria	—	2
11. Influenza	36	16
16. Dysentery:—		
Amoebic	29	24
Bacillary	—	2
Undefined or due to other causes	1	3
20. Leprosy	1	—
21. Erysipelas	—	1
25. Other epidemic diseases:—		
Chickenpox	2	1
Rat bite fever	1	—
30. Mycosis	1	—
31. Tuberculosis, pulmonary and laryngeal	4	1
36. Tuberculosis of other organs:—		
Lymphatic system	1	—
38. Syphilis:—		
Primary	4	—
Tertiary	1	—
40A. Gonorrhoea and its complications	5	—
II. *General Diseases not mentioned above:*		
50. Tumours (non-malignant):—		
Lipoma	1	—
Sebaceous cyst	2	—
52. Chronic rheumatism	1	—
56. Rickets	1	—
57. Diabetes	1	—
58. Anaemia:—Other anaemias	3	11
60. Other diseases of the thyroid gland	1	1
66. Alcoholism	2	—
69. Acidosis	—	1
III. *Affections of the Nervous System and Organs of the Senses:*		
70. Encephalitis (not including encephalitis lethargica)	2	—
74. Apoplexy:—		
Haemorrhage	1	—
75. Other paralyses	1	—
77. Other forms of mental alienation:—		
Melancholia	1	—
Confusional insanity	—	1
78. Epilepsy	1	—
82A. Hysteria	1	—
Neuritis	5	2
Neurasthenia	2	11
Neuralgia	2	5
84. Other affections of the nervous system	2	—
Carried forward	295	156
Brought forward	295	156
85. Diseases of the eye and annexa:—		
Conjunctivitis	9	1
Glaucoma—chronic	—	1
Stye	—	1
Other diseases	10	6
86. Affections of the ear and mastoid sinus	27	12
Cerumen	3	2
IV. *Diseases of the Circulatory System:*		
89. Angina pectoris	—	2
90. Other diseases of the heart:—		
Valvular	—	1
Myocarditis	3	1
Disordered action of the heart	3	4
91. Arterio-sclerosis	2	—
93. Diseases of the veins:—		
Haemorrhoids	9	2
Varicose veins	1	—
94. Diseases of the lymphatic system:—		
Lymphadenitis	2	3
V. *Diseases of the Respiratory System:*		
97. Diseases of the nasal passages:—		
Adenoids	1	1
Polypus	—	1
Rhinitis	9	4
Coryza	31	10
98. Laryngitis	3	1
99. Bronchitis:—		
Acute	10	12
Chronic	4	3
100. Broncho-pneumonia	1	—
101. Pneumonia:—		
Lobar	2	—
Unclassified	1	—
105. Asthma	4	2
107. Other affections of the respiratory system:—		
Haemoptysis	—	1
VI. *Diseases of the Digestive System:*		
108A. Diseases of the buccal cavity and annexa:—		
Dental caries	9	14
Pyorrhoea	—	3
Gingivitis	—	1
108B. Stomatitis	2	2
Glossitis	1	—
109. Affections of the pharynx and tonsils:—		
Pharyngitis	11	6
Vincent's angina	—	2
Tonsillitis	33	23
111 A. Ulcer of the stomach	—	1
B. Ulcer of the duodenum	2	—
112. Other affections of stomach:—		
Gastritis	8	7
Dyspepsia	24	17
113. Diarrhoea and enteritis:—		
Under two years	2	4
Carried forward	522	307

Table VIa.—Continued.

Diseases	M.	F.
Brought forward	639	398
114. Diarrhœa and enteritis :—		
Two years and over ...	24	9
Colic	—	1
Colitis	7	1
115. Ankylostomiasis	2	—
116. Diseases due to intestinal parasites :—		
Cestoda (taenia)	1	—
Trematoda	—	1
Nematoda (other than ankylostoma).		
Oxyuris	1	—
117. Appendicitis	10	1
118. Hernia	1	—
120. A. Affections of the anus :—		
Fistula	2	—
B. Constipation ...	4	3
122. Cirrhosis of the liver :—		
Alcoholic	2	—
123. Biliary calculus	1	1
124. Other affections of the liver :—		
Hepatitis ...	4	3
Cholecystitis	3	—
Jaundice	1	1
VII. *Diseases of the Genito-urinary System : (non-venereal)*		
129. Chronic nephritis	1	—
130 B. Schistosomiasis	1	1
131. Other affections of the kidneys :—		
Pyelitis	6	4
Unclassified	1	1
132. Urinary calculus	1	2
133. Diseases of the bladder :—		
Cystitis	—	7
134. Diseases of the urethra :—		
Abscess	1	—
138. Salpingitis	—	2
140. Uterine haemorrhage (non-puerperal)	—	3
141 A. Metritis	—	6
141 B. Other affections of the female genital organs :—		
Displacements of the uterus	—	2
Dysmenorrhoea	—	3
Leucorrhoea	—	4
142. Diseases of the breast (non-puerperal) :—		
Mastitis	—	3
VIII. *Puerperal State* :		
143. A. Normal labour ...	—	16
B. Accidents of pregnancy :—		
Abortion	—	1
148. Puerperal toxaemia	—	2
149. Sequelae of labour	—	1
IX. *Affections of the Skin and Cellular Tissues* :		
152. Boil	19	5
Carbuncle	2	1
153. Abscess	10	2
Whitlow	3	2
Cellulitis	6	—
154. A. Tinea	2	2
B. Scabies	1	—
Carried forward	639	398

Diseases.	M.	F.
Brought forward	639	398
155. Other diseases of the skin :—		
Erythema ...	1	2
Urticaria	3	7
Eczema	16	12
Herpes	3	2
Prickly heat	2	—
Prurigo	—	1
Chiggers	2	—
Dermatitis	—	4
Acne	2	2
Impetigo	2	—
Ulcer	4	4
X. *Diseases of Bones and Organs of Locomotion (non-tuberculous)* :		
156. Diseases of bones :—		
Osteitis	—	1
Periostitis	1	1
157. Diseases of joints :—		
Arthritis	1	—
Synovitis	9	—
158 Other diseases of bones or organs of locomotion :—		
Lumbago ...	11	3
Myalgia ...	9	2
Fibrositis	1	1
XI. *Malformations* :		
159. Undescended testicle ...	1	—
XII. *Diseases of Early Infancy* :		
162. Other affections of infancy ...	—	1
XIV. *Affections produced by External Causes*:		
166. Poisoning	—	1
175. Food poisoning	—	2
176. Attacks of poisonous animals :—		
Insect-bite	6	6
178. Burns (by fire)	2	1
184. Wounds (by cutting or stabbing instruments)	9	1
185. Wounds (by fall)	10	1
189. Injuries inflicted by animals, bites, kicks etc.	9	1
194. Exposure to heat :—		
Heatstroke	—	1
Sunstroke	1	—
201. A. Dislocation	2	1
B. Sprain	17	10
C. Fracture	11	2
202. Other external injuries :—		
Concussion	1	—
Bruises	6	—
Foreign body (except eye) ...	—	1
Abrasions	9	—
Unclassified	4	2
XV. *Ill-defined diseases* :		
205 A. Diseases not already specified or ill-defined :—		
Asthenia	18	13
Headache ...	3	2
Pyrexia of uncertain origin ...	5	—
N. Y. D.	1	—
Teething	1	—
Total .	822	486

TABLE VI.

Table VIb. Return of Diseases (Native Out-Patients) for the Year 1934.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries. Males	Rural Dispensaries. Females
I. *Epidemic, Endemic and Infectious Diseases :*				
1. Enteric group :—				
Type not defined ...	4	2	—	—
3. Relapsing fever	153	44	25	10
5. Malaria—Tertian (benign) ...	468	212	—	—
Quartan	34	16	—	—
Aestivo-autumnal	907	265	—	—
Cachexia	95	97	—	—
Blackwater fever	7	1	—	—
Type not defined ...	2,173	1,300	5,123	3,110
6. Smallpox	31	1	15	17
Alastrim	—	2	—	—
7. Measles	31	12	121	128
9. Whooping cough	117	138	497	463
11. Influenza	2,219	1,086	2,972	2,275
13. Mumps	14	5	—	—
16. Dysentery :—Amoebic	171	32	—	—
Bacillary	21	2	—	—
Undefined	94	50	1,104	661
20. Leprosy	120	31	45	33
24. Epidemic cerebro-spinal fever ...	1	—	—	—
25. Other epidemic diseases :—				
Rubeola	—	1	—	—
Chickenpox	14	4	—	—
Yaws	354	247	1,054	1,028
Trypanosomiasis	3	2	—	—
29. Tetanus	1	1	—	—
30. Mycosis	2	1	—	—
31. Tuberculosis, pulmonary and laryngeal ...	79	45	—	—
32. Tuberculosis of the meninges or central nervous system	—	2	—	—
33. Tuberculosis of the intestines or peritoneum	4	1	—	—
34. Tuberculosis of the vertebral column ...	17	8	—	—
35. Tuberculosis of bones and joints ...	25	12	—	—
36. Tuberculosis of other organs :—				
Skin	8	1	—	—
Lymphatic system	13	5	—	—
Genito-urinary system ...	1	—	—	—
37. Tuberculosis disseminated :—				
Acute	1	—	—	—
Tuberculosis unclassified ...	—	—	13	14
38. Syphilis :—Primary	324	196	—	—
Secondary	316	281	—	—
Tertiary	65	41	—	—
Hereditary	38	30	—	—
Period undefined	16	12	343	192
39. Soft chancre	7	—	—	—
40. A. Gonorrhoea and its complications ...	434	174	340	115
B. Gonorrhoeal ophthalmia ...	4	8	—	—
C. „ arthritis ...	4	6	—	—
41. Septicaemia ...	1	2	—	—
42. Other infectious diseases :—				
Filariasis	1	—	—	—
Onchocerciasis ...	16	—	—	—
Vaccination	15	7	—	—
Unclassified	—	5	1,020	127
II. *General Diseases, not mentioned above :*				
43. Cancer or other malignant tumours of the buccal cavity	1	1	—	—
44. Cancer or other malignant tumours of the stomach or liver	2	3	—	—
Carried forward	8,426	4,392	12,672	8,173

Table VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
Brought forward	8,426	4,392	12,672	8,173
46. Cancer or other malignant tumours of the female genital organs ..	—	2	—	—
48. Cancer or other malignant tumours of the skin	4	4	—	—
49. Cancer or other malignant tumours of organs not specified	6	3	9	2
50. Tumours (non-malignant):—				
Adenoma	1	3	—	—
Lipoma	10	1	—	—
Cyst	2	—	—	—
Dermoid cyst	3	—	—	—
Osteoma ...	4	—	—	—
Papilloma	1	—	—	—
Fibroma	2	—	—	—
Sebaceous cyst ...	4	2	—	—
Unclassified	95	22	26	26
51. Acute rheumatism	34	28	—	—
52. Chronic rheumatism	500	178	—	—
53. Scurvy	61	39	18	16
54. Pellagra	33	7	2	—
55. Beriberi ...	1	—	—	—
56. Rickets	—	4	—	—
57. Diabetes	2	—	—	—
58. Anaemia:—Other anaemias ...	65	23	16	23
60. Diseases of the thyroid gland:—				
Exophthalmic goitre ...	1	4	—	—
Other diseases of the thyroid gland ...	3	5	—	—
62. Diseases of the thymus	—	1	—	—
64. Diseases of the spleen ...	18	3	7	9
65. Leukaemia	1	—	—	—
Hodgkin's disease	1	—	—	—
66. Alcoholism	1	—	—	—
69. Other general diseases:—				
Acidosis	1	—	—	—
Unclassified	—	—	52	192
III. *Affections of the Nervous System and Organs of the Senses*:				
70. Encephalitis (not including encephalitis lethargica)	2	—	—	—
71. Meningitis (not including tuberculous or cerebro-spinal)	—	2	—	—
72. Locomotor ataxia	1	—	—	—
73. Other diseases of the spinal cord	3	—	—	—
74. Apoplexy:—Haemorrhage ..	3	—	—	—
Thrombosis	1	—	—	—
75. Paralysis:—Hemiplegia ...	13	1	—	—
Other paralyses	23	5	—	—
76. General paralysis of the insane ...	4	—	—	—
77. Other forms of mental alienation:—				
Dementia	1	—	—	—
Mania	3	—	—	—
Unclassified	14	2	—	—
78. Epilepsy ...	64	22	—	—
80. Infantile convulsions	—	2	—	—
82. Hysteria	—	1	—	—
Neuritis	16	9	—	—
Neurasthenia	8	—	—	—
Migraine	1	—	—	—
Neuralgia	178	82	—	—
Sciatica ...	2	1	—	—
84. Other affections of the nervous system:— Unclassified	7	1	163	70
Carried forward	9,624	4,849	12,965	8,511

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries Males	Rural Dispensaries Females
Brought forward ...	9,624	4,840	12,965	8,511
85. Diseases of the eye and annexa :—				
Blepharitis	1	5	—	—
Cataract	13	5	—	—
Chalazion	—	1	—	—
Conjunctivitis	3,045	2,803	7,815	8,196
Trachoma	8	12	—	—
Foreign body	19	5	—	—
Glaucoma	1	—	—	—
Stye	12	1	—	—
Tumour ...	3	—	—	—
Ulcer of cornea	37	17	—	—
Unclassified	197	88	69	60
86. Affections of the ear and mastoid sinus ...	1,433	832	3,502	2,610
Cerumen	67	14	278	97
IV. *Diseases of the Circulatory System :*				
87. Pericarditis	1	2	—	—
88. Acute endocarditis	3	—	—	—
89. Angina pectoris	4	6	—	—
90. Other diseases of the heart :—				
Valvular	45	14	—	—
Myocarditis	6	—	—	—
Disordered action	22	9	31	33
91. Diseases of the arteries :—				
Aneurysm	3	1	—	—
93. Diseases of the veins :—				
Haemorrhoids	24	1	—	—
Varicose veins	10	—	—	—
Phlebitis	5	2	—	—
94. Diseases of the lymphatic system :—				
Lymphangitis ...	32	17	—	—
Lymphadenitis (non-specific) ...	61	19	—	—
95. Haemorrhage of undetermined cause :—				
Epistaxis	2	—	—	—
Affections of the circulatory system (unclassified)	—	—	51	29
V. *Diseases of the Respiratory System :*				
97. Diseases of the nasal passages :—				
Adenoids	2	—	—	—
Polypus	4	3	—	—
Rhinitis ...	14	6	—	—
Coryza	1,996	767	3,293	1,261
Sinusitis	—	3	—	—
98. Affections of the larynx :—				
Laryngitis	31	12	—	—
Oedema of the larynx ...	1	—	—	—
99. Bronchitis :—Acute	5,520	2,862	18,203	11,331
Chronic	363	231		
100. Broncho-pneumonia ...	85	59	—	—
101. Pneumonia—Lobar ...	129	26	—	—
Unclassified	19	5	598	464
102. Pleurisy	69	14	85	40
Empyema	3	—	—	—
103. Congestion of the lungs ...	2	—	—	—
Infarction of the lungs ...	—	1	—	—
105. Asthma ...	148	27	175	95
106. Pulmonary emphysema ...	2	—	—	—
107. Other affections of the lungs :—				
Unclassified	47	22	21	6
Carried forward	23,113	12,741	47,086	32,733

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
Brought forward	23,113	12,741	47,086	32,733
VI. *Diseases of the Digestive System*:				
108. A. Diseases of the buccal cavity and annexa:				
Dental caries	1,788	1,233	3,541	3,029
Alveolar abscess	7	2	56	18
Pyorrhoea	178	94	120	38
Gingivitis ...	52	22	39	23
B. Other affections of the mouth:—				
Stomatitis ...	153	80	514	289
Glossitis	9	2	—	—
Unclassified	1	—	—	—
109. Affections of the pharynx and tonsils:—				
Pharyngitis	830	333	710	472
Tonsillitis	469	218	352	211
110. Affections of the oesophagus ...	1	—	—	—
112. Other affections of the stomach:—				
Gastritis	68	27	2,196	956
Dyspepsia	620	292		
113. Diarrhoea and enteritis:—				
Under two years	475	307	4,819	3,295
114. Diarrhoea and enteritis:—				
Two years and over ..	882	376		
Colic	31	12	—	—
Colitis	136	65	—	—
115. Ankylostomiasis	2,518	1,107	1,866	1,540
116. Diseases due to intestinal parasites:—				
Cestoda (taenia) ...	18	5	—	—
Trematoda	4	—	—	—
Nematoda (other than ankylostoma):—				
Ascaris	813	412	—	—
Strongylus	1	1	—	—
Oxyuris	4	6	—	—
Other parasites	3	—	—	—
Unclassified	6	—	557	326
117. Appendicitis	11	—	—	—
118 A. Hernia:—Femoral	1	—	—	—
Inguinal	46	—	23	—
B. Intestinal obstruction ...	1	—	—	—
119. A. Affections of the anus:—				
Fistula	8	4	—	—
Fissure	2	1	—	—
Prolapse	5	2	—	—
B. Other affections of the intestines:—				
Constipation	6,854	3,589	13,289	7,215
Unclassified	4	2	354	209
121. Hydatid of the liver	1	—	—	—
122. Cirrhosis of the liver:—				
Alcoholic	3	—	—	—
Other forms	3	2	—	—
124. Other affections of the liver:—				
Abscess	5	3	—	—
Hepatitis ...	12	2	—	—
Cholecystitis	2	—	—	—
Jaundice	18	5	—	—
126. Peritonitis (of unknown cause) ...	4	1	—	—
127. Other affections of the digestive system:—				
Unclassified	13	4	—	—
VII. *Diseases of the Genito-urinary System*: (non-venereal)				
128. Acute nephritis	8	6	—	—
129. Chronic nephritis	7	1	—	—
130. B. Schistosomiasis	2,005	488	1,848	653
Carried forward	41,193	21,445	77,370	51,007

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
Brought forward	41,193	21,445	77,370	51,007
131. Other affections of the kidneys :—				
Pyelitis	5	7	—	—
Perinephric abscess	1	—	—	—
132. Urinary calculus	3	1	—	—
Renal colic	1	—	—	—
133. Diseases of the bladder :—Cystitis ...	33	16	11	4
Incontinence of urine	—	1	—	—
Retention of urine	2	—	—	—
134. Diseases of the urethra :—				
Stricture	1	—	—	—
Fistula	1	4	—	—
Extravasation of urine ...	1	—	—	—
Unclassified	10	1	—	—
135. Diseases of the prostate-Hypertrophy ...	5	—	—	—
Prostatitis ...	9	—	—	—
136. Diseases (non-venereal) of the genital organs of man :—Epididymitis ...	14	—	—	—
Orchitis ...	17	—	—	—
Hydrocele ...	79	—	—	—
Ulcer of penis ..	19	—	—	—
Phimosis ...	9	—	—	—
Para-phimosis	2	—	—	—
Haematocele	2	—	—	—
Unclassified ...	—	—	3	—
138. Salpingitis	—	19	—	—
139. Uterine tumour (non-malignant) ...	—	2	—	—
141. A. Metritis	—	13	—	—
B. Other affections of the female genital organs.				
Displacements of the uterus ...	—	2	—	—
Amenorrhoea	—	4	—	—
Dysmenorrhoea	—	15	—	—
Menorrhagia	—	1	—	—
Prolapse ..	—	1	—	—
Vaginitis	—	1	—	—
Unclassified	—	11	—	2
142. Diseases of the breast (non-puerperal).				
Mastitis	—	29	—	—
Abscess of breast	—	78	—	—
Unclassified	—	2	—	72
VIII. *Puerperal State :*				
143. A. Normal labour	—	65	—	8
B. Accidents of pregnancy :—				
Abortion	—	15	—	2
Other accidents	—	9	—	14
144. Retained placenta	—	1	—	—
145. Other accidents of parturition ...	—	24	—	—
146. Puerperal septicaemia	—	12	—	—
147. Embolism	—	1	—	—
150. Puerperal affections of the breast ...	—	2	—	—
IX. *Affections of the Skin and Cellular Tissues :*				
151. Gangrene	18	8	—	—
152. Boil	503	137	1,569	1,213
Carbuncle	25	8	—	—
153. Abscess	567	234	939	803
Whitlow ...	252	79	488	259
Cellulitis ...	220	70	83	40
154. A. Tinea ...	444	115	130	73
B. Scabies ...	10,218	3,803	12,089	7,239
Carried forward	53,654	26,236	92,682	60,736

TABLE VIb. Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
Brought forward	53,654	26,236	92,682	60,736
155. Other diseases of the skin :—				
Erythema	14	8	—	—
Urticaria	63	37	—	—
Eczema	1,112	740	—	—
Herpes	45	26	—	—
Psoriasis	59	20	—	—
Prickly heat	1	—	—	—
Elephantiasis	13	5	—	—
Myiasis	4	3	—	—
Chiggers	225	113	603	386
Dermatitis ...	229	172	—	—
Acne	2	—	—	—
Impetigo	501	199	—	—
Wart	2	1	—	—
Ulcer	6,631	3,100	18,050	11,845
Unclassified	54	40	4,538	3,356
X. *Diseases of Bones and Organs of Locomotion (non-tuberculous)* :				
156. Diseases of bones :—				
Osteitis	14	5	—	—
Periostitis	15	2	—	—
Osteomyelitis	12	3	—	—
157. Diseases of joints :—				
Arthritis	48	17	—	—
Synovitis	171	41	180	57
158. Other diseases of bones or organs of locomotion :—				
Bursitis	2	1	—	—
Ganglion	7	8	—	—
Lumbago	492	109	1,361	734
Myalgia	1,921	804	5,053	2,991
Tenosynovitis	6	3	—	—
Unclassified	15	3	—	—
XI *Malformations* :				
159. Hydrocephalus	1	1	—	—
Undescended testicle	1	—	—	—
Unclassified	5	2	—	—
XII. *Diseases of Early Infancy* :				
160. Congenital debility	11	7	—	—
161. Injury at birth	2	—	—	—
XIII. *Affections of Old Age* :				
164. Senile dementia	1	—	—	—
Senility	75	13	—	—
XIV. *Affections produced by External Causes* :				
173. Food poisoning	18	13	6	9
176. Attacks of poisonous animals :—				
Snake-bite	49	10	—	—
Insect-bite	129	52	—	—
177. Other accidental poisonings ...	2	1	—	—
178. Burns (by fire)	653	417	3,151	2,511
179. Burns (other than by fire) ...	72	52		
183. Wounds by firearms (war excepted) ...	1	1	—	—
184. Wounds (by cutting or stabbing instruments)	3,831	799	—	—
185. Wounds (by fall)	2,733	636	—	—
186. Wounds in mines or quarries ...	53	10	—	—
Carried forward	72,949	33,710	125,624	82,625

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
Brought forward ...	72,949	33,710	125,624	82,625
187. Wounds (by machinery) ...	8	—	—	—
188. Wounds (by crushing)	19	5	—	—
189. Wounds inflicted by animals, bites, kicks, etc.	565	182	553	346
192. A. Over-fatigue	1	—	—	—
195. Lightning stroke	1	—	—	—
199. Murder by other means ...	1	—	—	—
201. A. Dislocation	30	10	—	—
B. Sprain	258	34	—	—
C. Fracture ...	131	35	53	23
202. Other external injuries:—				
Concussion	5	—	—	—
Bruises	642	123	—	—
Foreign body (except eye) ...	44	19	—	—
Abrasions	1,120	197	—	—
Unclassified	1,900	602	31,607	11,294
XV. *Ill-defined Diseases:*				
204. Sudden death (cause unknown) ...	1	—	—	—
205. A. Diseases not already specified or ill-defined.				
Ascites	21	4	—	—
Oedema	20	3	—	—
Asthenia or debility	152	29	—	—
Shock	2	—	—	—
Headache	1,522	415	—	—
Pyrexia of uncertain origin ...	22	4	—	—
Diseases not diagnosed ...	6	1	—	—
Unclassified	—	—	6,186	2,736
B. Malingering	10	1	—	—
Malnutrition	1	—	—	—
TOTAL ...	79,431	35,374	164,023	97,024

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I reached Zomba on my return from leave on the 15th January, resuming duty two days later.

2. *Tsetsefly Surveys.* I proceeded in May to the Northern Province for the purpose of making a tsetse reconnaissance in the Dowa and Fort Manning Districts, and travelled afoot from end to end of the region that was formerly fly menaced. In the former district I found one small fly focus to be existent, as for some years past, near the Mndi Estate south of the former belt of clearing and settlement, the woodland hereabouts being more favourable for the spread of the insects than almost anywhere in the district.

I submitted a recommendation that bushfiring should be prohibited here until the late dry season when burning should be organized in such a way as to ensure the whole area being thoroughly burnt out.

I further urged the clearing of the central thicket, about 300-400 acres, and its occupation either by natives or by a European, the soil obviously being rich.

In the Fort Manning District I found flies south of the former belt of clearing at the confluence of two rivers, the Ludzi and the Bua, where, again, they have been established for some years, their continued presence in this region being due, I believe, to the concentration of game which, having been harried to the south and southwest by the free shooting, has been prevented from escaping further north or east by the papyrus swamps of the rivers. In this locality it would be difficult and expensive to carry out control measures, for the soil is poor and unsuitable for much settlement, and as the game must be steadily dwindling and the fly still shows no tendency to spread I made no recommendation, determining merely to keep watch, as hitherto, on any possible movement.

In the Kamwendo thicket where the presence of the insects caused some anxiety in 1931-32 from their propinquity to the main road I took two only on this occasion, a part of this being now included in a large estate now opened up by a European for tobacco. The main road, too, was entirely free of the insects, the clearing which runs along its north side being well maintained and, indeed, for the most part under maize.

My only recommendation here was a thorough burn out of the thicket again in due course, and a similar measure for two others south of the road which seem to be especially suitable for occupation by the fly.

I made a second survey in December, still finding a few flies in the thicket in Dowa to which I have already referred, although it had been well burnt out, and in consequence again emphasised the desirability of settlement and clearing. I then found the Kamwendo thicket, which had also been well burnt out, to be entirely free of the insects as were also the other dense patches of bush to the south of the trunk road.

I am of the opinion, therefore, that the position as regards fly in these regions continues to remain satisfactory.

2(a). I proceeded also in May to the fly area bordering the shore of the lake in Dowa District with a view to ascertaining the present situation regarding the insects in the neighbourhood of the railhead and the projected township at Salima, and to forming some conclusion as to whether they are likely to be spread by the railway to the uplands of the Ncheu District, or through the agency of motor vehicles along the motor road to Lilongwe, then nearing completion.

I found the flies still to be swarming in the neighbourhood of Salima as they were when the Royal Society's Sleeping Sickness Commission was out here, over twenty years ago. They were especially numerous along the motor tracks leading to the lake shore and incompleted earthworks between railhead and the lake. Contact between man and the fly is likely to be far greater here in the near future, as the outcome of railway and settlement schemes now developing, than has hitherto been the case and, bearing in mind that this was one of the main centres in which Sleeping Sickness broke out in 1910-13, it seemed to me that measures aiming at the reduction of the fly should now be put into effect. I therefore recommended, as a preliminary to the settlement and clearing eventually expected, a burn out at a favourable season and a game drive by natives organized by Administrative Officers with the idea of trying to expel surviving animals to the north where there is less native settlement. But before it was possible to put these recommendations into effect I was able to modify them, withdrawing the suggestion for the drive, for I learnt that a large acreage in this region had been applied for by Europeans for cotton growing and that it was proposed to make every effort to stimulate cotton production by natives living in it. I now understand that the estimate for the present crop of seed cotton from this area is 1,000 tons (as well as 1,000 tons from the fly area along the lake shore in Dedza) and, having in mind the very marked reduction of the fly which took place some years ago when a much smaller acreage in the same region was put under cotton by Europeans, I have little doubt that this development alone will go far to reduce the fly menace.

As to the possibility of the spread of fly by the railway, there can be no doubt, judging by what has already happened in Tanganyika Territory, that fly will be carried out of the lake shore area by trains. But since other large tracts of country traversed by the line in Dedza and Ncheu have long been infested it seemed to me hardly necessary under present economic conditions to recommend any preventive measures, especially as I considered the chance of the insect ultimately reaching the upland remote, for there are long stretches of open country interspersed with woodland which harbour neither fly nor game as a rule, between it and the nearest fly area. I stressed the necessity for keeping careful watch for cases of Sleeping Sickness in these areas since conditions now exist under which it could soon become widespread.

The possibilities of the spread of fly up the new road into Angoniland I considered as being remote, for apart from the change in climatic conditions which is experienced in a climb of 1,550 feet in an hour or two (a factor likely to discourage fly), the bush is very scanty for the last thirty miles and does not provide at any season the shade conditions on which the fly seems to depend.

3. In September I made a survey in Zomba for the breeding places of the flies more especially associated with man, submitting a report in which I gave a detailed list of these and made some criticism of the sanitation of the township, especially of the method of disposal of night soil and of household rubbish. My final conclusion was that the plague of flies there is very largely due to the unduly high proportion (as it seemed to me) of resident natives compared with the European community.

4. *Research.* In March I was joined by Professor J. G. Thomson, of the Chair of Protozoology at the London School of Hygiene and Tropical Medicine, who made a stay of four and a half months for the purpose of continuing our joint investigation of the malaria problem so far as concerns this country and of carrying out experimental work on the mechanical transmission of the pathogenic protozoa.

As concerns the work on malaria, my own activities were limited to collecting for his examination large numbers of blood films from various parts of the country, the South Nyasa District, the lake shore region of Dowa and Dedza Districts and Angoniland in particular. In our work on the protozoa, however, our respective tasks were more equally divided, for while Professor Thomson carried out the microscopical work it fell to me to make observations on the habits of the Muscid flies, more especially associated with man, particularly *Musca spectanda Wied* (=*M. sorbens, Wied*:) to breed them so as to have clean insects for the purposes of experiment, to maintain them, to feed them on the material containing the organisms, and finally to dissect them submitting the contents of the alimentary canal, often from end to end, for his examination. As the outcome of this work we were able to publish a short preliminary account of our investigation (1934), a summary which may suffice for the purpose of this report:—

> "1. Nonbiting haematophagous muscids feed readily to repletion on blood, serum, serous exudate, ulcers, sores, and also secretions from the nose, eyes and mouth. After a meal a certain proportion of these flies pass blood or serum in their numerous dejecta, which may contain large numbers of living trypanosomes, leishmania, or the *Treponema pertenue* of yaws.
>
> 2. These haematophagous flies have their preferred hosts—for example *Musca spectanda,* Wied, which occurs in great abundance in Nyasaland, favours man. It lays its eggs exclusively in human faeces, breeding very freely; it derives moisture from human faeces, and could thus take up *L. donovani* from this source, since the organism is known to occur sometimes in this medium. Large numbers attack persistently and with determination scratches, cuts and sores of the skin of man in search of food, and also haunt the eyes, nose and mouth in search of fluid.
>
> 3. *Trypanosoma brucei* in the blood of rats and dogs are readily ingested by *M. spectanda,* and during a period varying between five minutes and six hours these flagellates can be passed alive in the numerous drops of dejecta passed through the gut of the fly. Rats were experimentally infected by (i) the intraperitoneal injection of these dejecta, (ii) by placing a drop of the dejecta on a fresh cut on the ear, and (iii) by placing the dejecta on a drop of blood exuding from the bite of a tabanid. *T. brucei* in dejecta introduced in this manner into the eye, nose and mouth did not produce infection.
>
> Certain flies after a feed extrude a drop of ingested blood containing living trypanosomes from their proboscis five to ten minutes after a full meal.
>
> 4. Living leptomonads in cultures of *L. donovani, L. infantum* and *L. tropica* are freely ingested by *M. spectanda,* and are passed viable for several hours after a feed. There can be no doubt that these flies could ingest the round tissue forms of all the human forms of leishmaniasis and pass them in a viable state either through the gut or by regurgitation to sores or mucous membranes. It would seem certain that both kala-azar and oriental sore could be actively transmitted through the agency of these flies.
>
> 5. *Treponema pertenue* of yaws passes rapidly in a viable form through the gut of *M. spectanda,* and so could easily be deposited on cuts and abrasions".

Subsequent to Professor Thomson's visit I endeavoured to ascertain whether *Leishmania donovani, L. infantum* and *L. tropica* can undergo cyclical development within *M. spectanda,* for as it has long seemed to me certain evidence suggests that flies such as these may be responsible for the spread of the last condition if not of the other two. Thus Chadwick and McHattie (1927) drew attention to the very marked seasonal incidence of oriental sore in dogs in Iraq, the condition being very prevalent during the winter months—late November to early April—but entirely absent during the summer ones. The climate is a subtropical one, as it is in this country: the seasons are more or less sharply defined also, and the conditions which favour the breeding of the Muscids that come into relation with man and his domestic animals must be approximately similar. In this country the insects are at a minimum when the heat is greatest and the atmosphere driest, for then they have difficulty in obtaining food and moisture, and they are at a maximum when the rains are well advanced and the heat begins to moderate. My expectation would be that in Iraq, though I have no information on the matter, the real fly plague begins in November, possibly in late October if there are early showers, and if this be the case, then, allowing, as stated in the paper referred to, that the incubation period in nature is generally over a month and possibly two or three months (the condition first coming into evidence in November) it is surely not unreasonable to suspect one of the common haematophagous flies as the indirect carrier. But in any case since the insect vector is undetermined there must be considerable uncertainty as to the incubation period following infection by natural means and it does not necessarily follow that the incidence of the disease bears any obvious connection with the fly season. Further points in favour, as it seems to me, of the theory are that since the causative organism is restricted, so far as I have been able to learn to the cutaneous lesions, the insect vector must have a special tropism, such as is so very definite in these flies, to such lesions, for otherwise the transference of the parasite would be so very uncertain while nature is necessarily very sure in her methods. Moreover if the Muscids *are* the vectors a necessary result of their feeding habit would be the presence of the sores in the immediate neighbourhood of mucous membranes, and that this is the case is most convincingly brought out by the figures given in the paper referred to. In my own limited experience sandflies bite anywhere, and are not specially attracted either to mucous membranes or to breaches of surface.

The possibility is one which at all events requires to be ruled out, the more so since as Professor Thomson found when he was here in the case of the Nyasaland species, the intestinal tract forms such an amazing "culture tube" (to use his expression) for various natural flagellates, *Herpetomonas*—probably two species, *Strigomonas* and Microsporidia.

In pursuance of the idea I fed bred *M. spectanda* on cultures of *L. tropica*, *L. donovani* and *L. infantum* (dog strain) which Professor Thomson most kindly obtained for me, allowing them to feed subsequently at scratches on the ears of experimental animals—dogs. In one experiment concerned with *L. tropica* fifteen of these flies made meals totalling fifty one from one of the animals between the 2nd and 15th day from their feed on the culture. In an experiment concerned with *L. donovani* twenty six of the same flies made between them twenty six meals between the 6th and 15th days after their feed on culture, and in a further experiment concerned with this flagellate another species of haematophagous Muscid, at present undetermined, made a total of a hundred and one meals subsequent to those on culture (in three instances from blood issuing from a puncture made by a Tabanid).

In a further experiment also concerned with this flagellate seven of the flies were allowed to feed at the inner canthus of the eye of a dog, obtaining in all fourteen feeds from the lachrymal secretion between the 2nd and 12th days, and in an experiment with *L. infantum* thirteen of these flies made a total of fifty six meals, from scratches, between the 6th and 16th days after their feed on the culture and a series of the undetermined species similarly fed thirty eight times between the 2nd and 13th day from their meal on culture.

None of the animals showed any signs of infection subsequently.

I dissected a number of these flies, examining every region of the alimentary canal microscopically. The first ten of a series of twenty fed on a culture of *L. tropica*, examined between the fourth and the eighth day, proved entirely negative, but in the gut of the ten remaining which I dissected between the twelth and twenty second day parasitic organisms were present in such vast numbers that the fluid content was pearly-white. These were determined by Professor Thomson as Microsporidia. I examined a further series of sixteen between the 6th and 20th days from their feed, all being negative, and twelve in a third series between the 16th and 29th days, all again being negative. I then endeavoured to carry the investigation as concerning *L. donovani* further by maintaining flies that had fed on the culture on the blood or serum of a rabbit, this having been the culture medium, thinking that conditions for the multiplication of the organism within the fly might thus be rendered more favourable. Of flies thus fed I dissected twenty three in all between the 5th and 25th days, in four of which, dissected on the 13th, 14th, 21st and 25th days, I again found innumerable Microsporidia.

The outcome of this work was entirely negative. I had, indeed, little expectation otherwise since the flagellates do not occur in the cultures in the resting phase in which they must normally be ingested by an insect vector. But, the opportunity for exploring the possibility however remote existing, it seemed well to utilize it.

6. On concluding this work, the cultures being at an end, I endeavoured to ascertain to what extent *M. sorbens* which seems to select for feeding the foulest of sores, especially those of lepers, ingests and passes the *Bacillus leprae*. For the purpose of this investigation I selected a case of Leprosy (mixed type) in a young male native showing evidence of the active progress of the disease, and having ascertained the existence of acid fast bacilli in great abundance in the exudate from a sore on the dorsum of one of his fingers, the crust of which I removed, I allowed bred flies to feed on it. On examination of their excreta passed up to 6 hours afterwards, at 8 hours, between 8 and 24 hours, between 24 and 48 hours and at 75 hours I found acid-fast organisms similar in every respect to those present in the sores, sometimes singly but more often in wisps, and these were similarly present though not so numerous in excreta passed between 120 and 144 hours after the feed. I dissected one of these flies daily for four days, again finding large numbers of the organisms in the intestinal contents, and then with a view to making control observations fed a series of twenty bred flies on the exudation from an ordinary ulcer on the leg of a native, which I found to be free of acid fast bacilli. I examined 67 drops of excreta which they passed during the first 24 hours, 64 drops passed during the second day, 7 passed during the third, and 76 passed on the fourth day: all were negative as to these bacilli. I then examined 100 drops passed in the course of four days by 20 captured flies, all of which were negative.

I then fed a series of bred flies on the leprous sore in its natural state, its crust untouched, examining 438 of their faecal deposits passed between the 1st and 13th days, some actually as a fly was feeding, detecting acid fast bacilli even at the end of this period in one instance. These examinations are summarized in the following table:—

Excreta passed in	1-7 hrs.	7-24 hrs.	24-48 hrs.	3rd day	4th day	5th day	6th day.
Drops positive	33	74	30	32	6	3	20
,, negative	—	—	—	39	11	33	24
Total exd.	33	74	30	71	17	36	44

Excreta passed on	7th day.	8th day.	9th day.	10th day.	11th day.	12th day.	13th day.
Drops positive	9	12	—	1	1	—	1
,, negative	17	20	6	23	33	—	15
Total exd:	26	32	6	24	34	—	16

I was also able to secure vomit spots and examine two made by the insects at five hours from their feed, and one at eight hours, in all three of which the bacilli teemed.

I had fed the flies from time to time on droplets of freshly drawn blood (my own) and it then occurred to me to examine such blood as might be remaining after a fly had fed with a view to ascertaining if any of the organisms had been deposited by it. I fed a fourth series, accordingly, on the leprous sore and at the end of five hours provided each separately with a drop of my blood on a slide. In seven instances I found bacilli in abundance after the completion of the feed, my examination proving negative as regards the twelve specimens remaining, though it is quite possible I failed to detect the organisms among some of the debris, particularly the leucocytes which are drawn out and massed together and so tend to conceal them.

The possibility that Muscids, particularly those which habitually infest sores, may be responsible for the communication of Leprosy seems to have been little explored. Leboeuf (1912, 1913) pointed out in a number of papers the possibility of the disease being transmitted by non-biting flies. He noticed that house flies frequently settled on exposed leprous sores and found that of 23 that had done so 19 contained *B. leprae.* He also found bacilli in their faeces passed two days from their feed. Minett (1914) examined *Musca domestica* and *Lucilia* at the end of three days from their feed on ulcerated patches present on lepers, finding well-formed leprosy bacilli in 4 out of 30 specimens. He considered that flies may transmit the disease by depositing faeces on the nasal mucous membrane or on wounds especially during sleep.

Honeij and Parker (1914) carried out a few experiments with *M. domestica* and *Stomoxys calcitrans*, and noting the greater frequency with which the latter appeared to take up the bacilli drew the conclusion that it is the more likely of the two to play an important part in the transmission of the disease. Only on one occasion did these authors succeed in finding acid-fast bacilli in the vomit-spots of flies.

In my experience, however, flies such as these do not habitually adopt such means of trying to satisfy their appetites. The house fly of the temperate zones, and the domestic species of the African Tropics, *M. vicina*, do on occasion resort to sores, but rather exceptionally: the difference in habit between these and *M. sorbens* is well brought out by a study of data which I obtained in the course of the year when I had catches made of Muscids in houses and in the kitchen at the same time with catches from the backs of natives nearby and from their sores. In the first two sets of catches the *domestica* group was overwhelmingly dominant as was *M. sorbens* in the two latter.

The evidence that I have brought forward, then, tends to show that *M. sorbens* may be the transmitting agent of acid fast bacilli present in a leprous sore—and almost certainly the causative organism either through its vomit drop or its excreta, and further that a possibility of the organism being directly sown by its proboscis on a sore or mucous membrane exists. As has been pointed out by various authors including Manson-Bahr (1929) simple implantation of the bacillus experimentally does not suffice to produce infection, for "of the many inoculations that have been made only one has any claim to be successful". May not the explanation of the failure be that passage through one of these flies is necessary to activate the organism and make it infective, its fatty or gelatinous capsule undergoing partial solution, perhaps, as the result of the action of the digestive fluids with which it comes in contact. To test the theory if possible I injected the content of the gut of lepra-fed flies five hours from their feed into the supraorbital region of two Cercopitheques, and of a baboon, introducing some of the material into the nostrils of the latter. I injected it also into the tails of two rats, not in any expectation of any result as concerns them, however. There cannot yet have been time for any outcome.

7. *Field observations.* I continued my field studies of Tabanidae as occasion offered. In the course of these I ascertained in April that the larvae of a Tabanus, as yet undetermined but probably *taeniola* or a species very nearly allied, make for the protection of their puparia the amazing mud cylinders such as I described for *T. biguttatus* some years ago. In that month I found hundreds of such cylinders, from which most of the imagos had recently emerged, in a rather different type of breeding place to that utilized by *biguttatus*, but succeeded in obtaining about twenty from which the flies came out in due course.

I also ascertained the breeding habits of three if not four other Tabanidae which present unusual features, for the larvae are found, not in the habitat usual for such creatures--water or mud—but in dry debris in the forks of trees, usually high up, and less frequently in rot holes. Here they occur not singly but often as many as ten or fifteen together since they do not exhibit the cannibalistic habit that characterizes the mud-frequenting species. I found in due course also egg masses on the bark above such breeding places.

For months—from July onwards—I maintained a large number of these, which I estimate at from 200-300. They grew very slowly, but finally at the beginning of the rains they began to pupate, and by the end of the year I had bred out a long series of imagos of a species as yet undetermined. A second proved to be a species of *Thriambeutes*, rare in this country in my experience, for I have taken only two before; others have yet to emerge.

I made the observation also that the larvae of Tabanus, almost certainly *par* are aquatic, breeding in the Shire River as does *T. africanus*, but whereas the larvae of the latter are associated with the plant *Pistia* and with this only, the larvae of *par* are similarly exclusive as regard another floating aquatic plant as yet undetermined, hiding in among the rootlets so well that they are difficult to discover.

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W. A. LAMBORN,
Medical Entomologist.

ANNUAL REPORT OF THE MEDICAL LABORATORY FOR THE YEAR 1934.

(A) General Review of the Year.

A total number of over four thousand specimens were examined, an increase of over a thousand as compared to the number for the previous year.

During the latter half of the year I was absent on home leave, and Dr. E. J. Blackaby kindly supervised the work until my return.

(B) Staff.

The staff remains the same as previously, namely, one European Pathologist and two African assistants. One of the latter is really a third grade dispenser and only useful for very minor tasks.

The help of a qualified laboratory assistant who could undertake routine duties and thereby leave me free to conduct operations of a more important nature, is urgently required. If such a person could be engaged the work could be greatly extended, whereas, at the moment with the existing staff any marked increase in the number of operations performed cannot be expected as we are already fully occupied.

(C) Stations from which specimens were received.

Only 184 specimens were received from stations other than Zomba.

The actual figures are as undermentioned.

Fort Johnston	14
Dedza	28
Karonga	9
Cholo	92
Blantyre	17
Fort Jameson	11
Likoma	4
Lilongwe	2
Port Herald	5
Mlanje	2
Zomba	4,011

It is unfortunate that so few specimens are received from large centres such as Blantyre and Lilongwe.

(D) Financial value of the work accomplished.

The cost of the various examinations has been calculated according to the tariff of fees issued by one of the South African routine laboratories.

	£	s.	d.
Blood smears. 734 @ 10/- each	367	0	0
Sachs-Georgi tests. 366 @ 20/-	366	0	0
Complete blood counts. 17 @ 20/-	17	0	0
Widal tests. 17 @ 20/-	17	0	0
Blood grouping. 7 @ 10/-	3	10	0
Cultures. 1 @ 20/-	1	0	0
Bendien tests. 2 @ 40/-	4	0	0
Urine examinations. 596 @ 10/-	298	0	0
Faeces examinations. 2,035 @ 10/-	1,017	10	0
Precipitin tests. 6 @ 20/-	6	0	0
Blood stain examinations. 6 @ 10/-	3	0	0
Poison analysis. 20 @ 100/-	100	0	0
Pus smears. 86 @ 10/-	43	0	0
Tissue examinations. 33 @ 20/-	33	0	0
Throat swobs. 12 @ 10/-	6	0	0
Sputum examinations. 43 @ 10/-	21	10	0
Vaccines. 7 @ 40/-	14	0	0
Water analysis. 32 @ 40/-	64	0	0
Cerebro spinal fluids. 8 @ 20/-	8	0	0
Urethral smears. 76 @ 10/-	38	0	0
Miscellaneous. 6 @ 10/-	3	0	0
Total	£2,430	10	0

PART II.

(A) *Malaria.* The total number of smears examined for the presence of malarial parasites was 715, and of this number 215 contained parasites. I do not propose however to detail the particular species of plasmodium, as many of the examinations were undertaken during my absence on leave without the constant supervision of a qualified person, and thus errors may have occurred.

The result of an analysis of my personal records concerning the incidence of species of the malarial parasite found in the blood of inhabitants of Zomba is as follows:—

Plasmodium falciparum, (Welch, 1897).	79.2%
,, *vivax*, (Grassi and Feletti, 1890).	16%
,, *malariae*,	4%
Undefined parasites.	0.8%

It should be remembered that the population of Zomba is essentially a "floating" one, and this remark applies to both the European and African sections, thus in undertaking a parasitic survey of the inhabitants the result is not necessarily indicative of the relative incidence of the three main species of Plasmodia in local infections. This fact gave rise to an interesting set of figures in my previous report in which the benign tertian parasite predominated, chiefly because a large number of films were examined from the soldiers of the King's African Rifles, their wives and children, all of whom had recently returned to Nyasaland from the region of Dar-es-Salaam and Zanzibar.

I am convinced that there is a definite seasonal variation in the incidence of the different species, so much so, that at one time *Plasmodium falciparum* predominates and at another time *Plasmodium vivax* and *Plasmodium malariae* appear in greater numbers.

Some years ago, when I was a medical officer at Fort Johnston and Mlanje, I made mention in the respective Annual Reports that the quartan type of parasite was common in those districts. Dr. Lamborn the medical entomologist had previously mentioned the presence of Plasmodium malariae in the blood of the Fort Johnston natives, and I am now under the impression that this parasite is becoming more common and spreading from the previous localities.

(B) *Trypanosoma lewisi.* Dividing forms of this parasite have only been observed once during 727 separate examinations.

(C) *Agglutinations.* Seventeen tests were conducted during the year of which number three were positive for *M. melitensis*, and two were positive for *Paratyphosus A.* The remainder of the tests were negative.

In all cases formalised broth cultures were used in making the tests.

(D) *Relapsing fever.* Nineteen blood smears contained the *Treponema duttoni.*

(E) *Modified Bendien test for the diagnosis of cancer.* Satisfactory results were given by the test in two cases, confirmed as malignant by clinical and histological examination.

PART III.

Urine Examinations. 596 specimens of urine were submitted to a general examination, of which number 543 were from Africans.

22.2% of the urines from Africans contained ova of the *Schistosoma haematobium.*

PART IV.

Examinations of Faeces. 2,035 specimens were examined, of which number 1,922 samples were from Africans.

The relative incidence of the various parasites found in the faeces is as follows:—
Total number of examinations upon which percentage infestation is based=2,768. (Composed of 846 specimens received during the year 1933, and 1,922 specimens during the year 1934).

Schistosoma mansoni	1.7%
Hookworm	30.6%
Trichuris trichiura	0.5%
Ascaris lumbricoides	4.2%
Strongyloides	1.3%
Enterobius vermicularis	0.45%
Hymenolepis nana	0.15%
Taenia	0.1%
E. coli	17.6%
E. histolytica	4.6%
Giardea intestinalis	0.2%
Balantidium coli	0.05%
Negative examinations	38.55%

PART V.

Tissues. 33 histological examinations of tissues were made during the year, of which number five proved of a malignant nature. One of the latter was a melanotic sarcoma which was removed from the foot of an adult native.

PART VI.

Medico-legal examinations. 20 complete chemical analyses of viscera were made for the purpose of detecting poisons. These analyses occupy a great amount of time but the results obtained have warranted the endeavour.

Blood grouping tests and precipitin tests were performed on six occasions.

PART VII.

Medical museum. The museum now contains over 300 specimens, some of which are of considerable interest. A division has been made into two sections, one dealing with native medicines and poisons and the other with pathological material.

In the near future an enlargement of the present accommodation will be necessary.

It is gratifying to note that several medical practitioners visited the museum during the year.

PART VIII.

Comments.

In reading the laboratory statistics for the year under consideration, it must be remembered that for the latter six months only a "skeleton" service was in operation and thus certain materials requiring special investigation were either sent elsewhere or kept until my return from leave, this particularly refers to specimens of a medico-legal nature.

An investigation concerning the Pharmacological Actions of various reputed Medicines and Poisons.

As previously described in my report for the year 1932 liquid extracts of the plants concerned were made by a process of percolation and repercolation. The action of the extracts was then tested on the tissues and organs of frogs.

(1) *Mkhunguni.* (*Pittosporum malosanum*).

Local use :—The leaves of the plant are powdered and dried and used as snuff for the cure of headache.

Pharmacological action :—

Involuntary muscle :—	No effect.
Voluntary muscle :—	No effect.
Nerve conduction :—	No effect.
Heart :—	No effect.
Local anaesthetic action :—	Nil.

Conclusions :—The liquid extract does not possess any pharmacological properties.

(2) *Kachirimphanda.* (Species undefined.)

Local use :—The root is dried and powdered and used as an irritant poison.

Involuntary muscle :—	No effect.
Voluntary muscle :—	No effect.
Nerve conduction :—	No effect.
Heart :—	No effect.
Feeding experiment to dog :—	No effect.

Conclusions :—There is no pharmacological evidence to confirm the opinion that the substance is an irritant poison.

(3) *Kananyulo.* (Species undefined).

Local use :—The bark of the plant is dried and powdered and used as an irritant poison.

Pharmacological action :—

Involuntary muscle :—	Stimulated.
Voluntary muscle :—	No effect.
Nerve conduction :—	No effect.
Heart :—	No effect.
Feeding experiment to dog :—	A purgative action occurred.

Conclusions :—This substance stimulates involuntary muscle and thus has a purgative action, it is therefore apparent that in large doses it will act as an intestinal irritant.

Resume of Examinations Performed.

	No. of specimens.
(1) *Blood examinations.*	
Europeans	56
Africans	1,085
Rats	57
Others	3
(2) *Urine examinations.*	
Europeans	50
Asiatics	3
Africans	543
(3) *Faeces examinations.*	
Europeans	113
Africans	1,922
(4) *Medico-legal examinations*	39
(5) *Pus smears*	86
(6) *Histological examination of tissues*	33
(7) *Throat swobs*	12
(8) *Sputum examinations*	43
(9) *Vaccines manufactured*	7
(10) *Water analyses*	32
(11) *Cerebro spinal fluids*	8
(12) *Milk samples*	1
(13) *Urethral smears*	76
(14) *Miscellaneous*	26

H. M. SHELLEY,
Pathologist.

A Review of the Incidence of Amoebiasis in Zomba, with Special Reference to European Cases.

BY

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Zomba, the seat of Government of the Nyasaland Protectorate is situated about 3,000 feet above sea level on the southern slopes of the base of Zomba Plateau. It lies approximately at the latitude S.15° longitude E.35°.

The mountain slopes are densely wooded except where clearings have been made for buildings and compounds. Channels—artificial and natural, conduct streams of running water which assist in maintaining a luxuriant growth of vegetation throughout the year. In the valley at the base of the mountain and lining the banks of streams, banana groves flourish; practically every compound possesses a superabundance of mango trees.

The rainy season usually extends from November to April with the heaviest rainfall in January and February. During these months the average mean maximum temperature is about 80°F. and the average mean minimum 64°F. The absolute minimum recorded during a year has been as low as 45°F. and the absolute maximum as high as 97°F. The hottest months are those just preceeding and following the rains. (See summary of meteorological observations attached). From 40 to 50 inches fall during the months November to April.

The community is almost entirely an official one. It consists of Europeans employed in Government Service; a few Europeans engaged in business; a small group of Indian traders; the wives and families of all these and, native servants with their wives and families.

The population is a "floating" one, due principally to departures on leave and to transfers to and from out-stations and other territories. The approximate population was recorded in 1933 as Europeans 240, Asiatics 150, Africans 2,800.

In the compounds surrounding all residences, accommodation in the form of one roomed brick houses is provided for servants. Servants number from three to six per European household and with their wives and families form a native community of from ten to twenty members living in close proximity to European residents.

Numerous other congregations of natives exist throughout the township. The District Prison, situated in the residential quarter, houses on an average 48 short term prisoners. The native warders with their wives and children occupy quarters in the vicinity.

At the Police Camp, situated near the Golf Course a further native community is in existence. This consists of about forty men with women and children, the total number residing there being probably about one hundred and fifty.

About three years ago a pipe borne "gravity feed" water supply was installed. The catchment area is situated on the top of Zomba Plateau and the source of supply is the Mlunguzi River. To conserve supplies during the dry season a dam has been built across the stream bed some distance above the point where the river is precipitated down the face of the mountain. At the base of the falls which are several hundred feet high, a sluice diverts the necessary supply of water into an open channel which wends its way around the face of the mountain high above Zomba. Two open reservoirs exist and from these, pipes lead off to a number of 10,000 gallon iron tanks situated throughout the town.

Practically every European residence has a stand pipe in its compound; street stand pipes have been placed at suitable points for the use of the native inhabitants. It is customary for Europeans to boil and filter all drinking water.

Chemical tests show that the water is of fair quality. The following are the results of a recent examination:—

	Plateau Dam.	Reservoir No. 1.	Reservoir No. 2.
Turbidity	Faint	Negligible	Negligible
Colour	Pale Yellow	Very slight yellow	Very slight yellow
Smell	None	None	None
Total residue	4.0	Not determined	1.6
Free ammonia	0.002	0.002	0.003
Albuminoid Ammonia	0.011	0.010	0.016
Nitrates	Nil	Trace	Trace
Chlorides	0.10	0.62	0.03
Oxygen absorbed 100C/30 min	0.30	0.17	0.15

All the above figures represent parts per 100,000.

The samples taken from the Plateau Dam and Reservoir No. 1 were obtained just after heavy rain; that from Reservoir No. 2 was taken before the rain.

The food supply of Zomba is abundant and varied. Beef, mutton and pork are obtainable throughout the year and practically all European fruits and vegetables are to be procured in season. Native market gardeners are the main source of supply; a few European residents who cultivate small vegetable gardens, confine their activities principally to lettuce and other vegetables or fruits which cannot safely be eaten uncooked when their origin is unknown.

Although the possible danger of consuming uncooked vegetables is probably realised by all, no assurance can be given that adequate precautions are always taken to ensure the absence of protozoal contamination. Many residents prefer to abstain from such foodstuffs rather than run any risk of infection.

EVIDENCE OF THE PREVIOUS EXISTENCE OF DYSENTERY IN ZOMBA.

It is probable that dysentery has been always endemic in Nyasaland. The Annual Medical Report of the Protectorate for the year 1912, which is the earliest statistical account of medical work in the country it has been possible to consult, records cases from almost every station submitting Returns. In that year, 317 cases—five of which were fatal—were reported; three of the cases appear in the "Return of Diseases" of the European Hospital, Zomba.

That the disease existed previously in Zomba is indicated by a communication dated 1908 from the Medical Officer, Zomba, addressed to the Town Council. It states "The principal diseases treated amongst the European population were dysenteries and allied diarrbœal complaints".

Previous to the year 1925 no attempt was made to differentiate the types of dysentery in the Annual Reports. In the report of the Medical Department for that year, five cases of amœbic dysentery are reported as having been treated at the Euoropean Hospital, Zomba; one of these cases died.

Three years previously in 1922 the Medical Officer, Zomba, who at that time was responsible for the care of both European and African patients, stated in his Annual Report to the Principal Medical Officer that "there were six cases of dysentery amongst Europeans and twenty-eight amongst Africans. All the European cases were of the amœbic type and the result of treatment with emetine indicated that the majority of the native cases were also amœbic".

A different opinion was expressed in the Annual Medical Report of the previous year (1921). In it the statement is made "that 329 cases of dysentery occurred with 26 deaths. The disease is usually of the bacillary type and is accompanied by a low mortality".

Shelley (1933) during the period 1932-33 examined 1123 faecal specimens from 279 Europeans and 844 Africans, all residents of Zomba. He found the incidence of parasitisation by *E. histolytica* as follows—

Africans	3.5. per cent (33)
Europeans	21.8. per cent (61)

Cysts were found in the faeces of 8.2 per cent of the Europeans and 9 per cent of the Africans who harboured this parasite.

The following figures from 1925 to 1934 illustrate the European cases of (1)amœbic dysentery (2) bacillary and undefined dysentery (3) diarrhœa and enteritis (over 2 years), recorded annually as occurring in Zomba.

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
(1) Amœbic dysentery	5	0	1	0	5	9	21	12	22	33
(2) Bacillary and undefined dysentery	0	0	0	0	7	0	5	0	1	0
(3) Diarrhœa and enteritis (over 2 years)	5	17	21	29	21	23	21	19	27	18

SEASONAL INCIDENCE AND FACTORS INFLUENCING THE SPREAD OF DYSENTERY.

It was not found possible—to pursue with any degree of accuracy—the enquiry into the seasonal incidence for a longer period than the last four years. Cases have been reported during every month of the year but the prevalence is most marked during the rainy season viz., November to April.

MONTHLY INCIDENCE OF CASES OF AMOEBIC DYSENTERY DURING THE YEARS 1931-1934.

	1931	1932	1933	1934
January	—	2	2	—
February	—	1	3	2
March	1	1	2	1
April	3	1	—	—
May	4	—	—	—
June	3	—	2	—
July	—	2	—	1
August	2	1	—	2
September	2	—	—	6
October	2	1	4	2
November	2	2	3	5
December	2	1	6	14
	21	12	22	33

Shelley in the 1933 Annual Medical Report states:—

> "The monthly incidence of sickness due to the parasite proves that fresh cases arise chiefly during the rainy season when flies are abundant and when the possibility of contamination of food is at the maximum".

The monthly incidence quoted by him is as follows:—

January	14	July	2
February	11	August	0
March	2	September	2
April	4	October	9
May	1	November	22
June	5	December	30

This is compiled from Laboratory records and is a combined return of European and African stool examinations during these months.

From correspondence in the files on the subject, it would appear that dysentery in former times was always prevalent at the onset or just previous to the onset of the rainy season.

In October, 1906, the Commissioner, Zomba, in a memorandum, instructed the Medical Officer to bring to his notice cases where officials suffering from dysentery or diarrhoea had failed to carry out the recommendations of the Principal Medical Officer regarding the boiling of drinking water. Thirty years ago, water was considered to be the main factor involved in the spread of dysentery; by 1910 the fly borne theory was being given prominence. In August of that year, Dr. H. S. Stannus, then Medical Officer, Zomba, issued a notice to householders requesting them "to keep their compounds free from organic and vegetable matter as at this season of the year an increase in the number of flies may be anticipated" and pointing out "that flies are responsible for the spread of dysentery and diarrhoea". Two years later in November, 1912, he again drew the attention of householders to the fact that "this is the season when dysentery becomes epidemic" and requested them "to keep a watch for cases occurring in their compounds".

That these observations were substantially correct has since been proved.

With the exception of the year 1932, the number of cases of amoebic dysentery recorded has increased considerably during the five years 1930-1934. Cases in the native population have also increased; during the year 1934, fifty nine cases are recorded from the African Hospital, Zomba, as compared with a possible twenty eight in 1922.

In this connection several factors must be considered,

(1) The occurrence in latter years of relapse cases.

(2) An increase in the local population.

(3) Improved facilities for diagnosis, resulting from the opening of a Medical Laboratory in charge of a whole time Pathologist.

(4) Soil in compounds having reached "Saturation point" by the prolonged deposition therein of night soil from residents' houses.

With reference to (1), it is of course impossible to differentiate a relapse from a new infection. During 1933, three, and in 1934, four of the cases recorded had previously been treated for amoebic dysentery.

(2) There has been a definite increase in the total number of officials employed in the country. From 1930 to 1933 the total numbers resident annually were:

1930		1931		1932		1933
257	...	260	...	267	...	282

in 1923, 1924 and 1925, the figures respectively were 217; 214 and 209; of course all new arrivals were not retained in Zomba. According to the 1933 and 1935 Staff Lists, in the former year about 90 officials were stationed in Zomba and 100 in the latter. Wives of officials in the former year numbered about 60, with 40-50 children. This comparatively large total of women and children forms what may be considered a "susceptible population".

(3) A description of the clinical conditions met with will be recorded in a following paragraph but a reference to them is not inappropriate in this section. Briefly, many of the cases were of a mild type; cases are reported occurring in young children.

It was not until the laboratory was opened that the stools of all patients complaining of intestinal disorders—however mild—were examined as a routine; previously, pressure of work did not permit this to be undertaken. Routine examination revealed that numerous cases of an apparently slight enteritis were really cases of amoebic dysentery. Once this was discovered and the prevalence of the disease realised, it became customary for residents to submit specimens and report to the Medical Officer, Zomba, slight intestinal disorders which had previously been disregarded as of no consequence.

(4) As this condition is primarily responsible for the existing state of affairs it will be considered subsequently under "Sanitation".

Clinical Types of Amoebic Dysentery.

Although amoebic dysentery is not differentiated in the Annual Medical Reports until the year 1925, no provision for such differentiation having been made in previous years, reference to Charts and Case Records in the European Hospital, Zomba, show that cases were recognised and treated in the year 1923. It appears certain that still earlier cases were recognised during the years of the Great War but no records of that time are available.

In 1923, 7 cases, not all of which were admitted to hospital on account of dysentery, were found to be infected with either cysts or vegetative forms of *E. histolytica.*

Although 7 cases were treated, only 5 people were involved as two patients were admitted twice during the year. Of these 5 people, only one had no previous history of dysentery;. 3 gave a very definite history of infection during the Great War.

Three of these cases were characterised by the occurrence of slight abdominal pain with the passage of blood and mucus of 24-48 hours duration and a slight rise of temperature to 99° or 100°F on the first day. Stools were never very numerous, averaging about 4 per diem and after the commencement of treatment with emetine symptoms rapidly disappeared.

The two remaining cases in 1923 both showed signs of hepatitis with some degree of enlargement and tenderness of the liver and a temperature of from 100 to 101°F for a few days. The temperature was rapidly controlled in both cases by the exhibition of emetine.

These two cases constituted the two re-admissions mentioned and although one then disappears from the records it is recorded that the other was admitted on no less than four more occasions and on the final occasion died from cardiac exhaustion.

Thus, among these 7 cases, there appear to be two distinct types of the disease.

(1) Those with an onset accompanied by some degree of abdominal pain, the passage of blood and mucus on several occasions and a slight rise of temperature for 24 hours. These have been referred to as "Acute Amoebic Dysentery".

(2) Those with definite signs and symptoms of involvement of the liver, referred to as "Amoebic Hepatitis".

These two types of cases are also to be found among the 108 cases which have been reported from 1925 up to the present day. A third type of which no case is recorded in 1923 has of recent years been comparatively common and has probably only been brought into prominence by the awakening of the residents to the fact that abdominal symptoms, especially when diarrhoea occurs, are a possible sign of amoebic infection. This third type is one in which the chief complaint is diarrhoea associated with a greater or lesser degree of abdominal discomfort and occasionally with the passage of mucus and very rarely blood. Apart from the abdominal discomfort, constitutional symptoms are not prominent.

In the hospital records, amoebic hepatitis is the rarest of the 3 types to be found, only 4 cases, with one death, being recorded in 108 cases.

According to Stitt (1929) liver abscess occurs in 20% of cases of amoebic dysentery. In the series under review no cases with this complication are recorded. On account of the "floating" nature of the population it has not been possible to follow up all cases and liver abscess may have developed in some subsequent to their departure from Zomba. It is obvious that the other types of the disease have been of a mild nature as only one death occurred among 104 cases, and that case was complicated by a pyelitis which later developed into a *B. coli* septicaemia. This case was also interesting in that amoebae were found in large numbers in the urine.

Apart from the hospital records which lead to the conclusion that the disease has been on the whole of a mild nature as regards immediate effects, one of us (L.C.M.) has had experience with 35 cases during the last 7 months and his experience agrees with that conclusion. Among these 35 cases it has been the exception to find a case in which the symptoms were in any way alarming and altogether only 3 cases have given any cause for anxiety.

The first was an elderly man who, six months previously, had been treated for diarrhoea with the passage of blood and mucus lasting for about a fortnight, without any amoebae being found. On the occasion he was first seen by one of us (L.C.M.), the temperature was 104°F accompanied by mild delirium. For two days after admission to hospital his cardiac condition gave rise to anxiety but he eventually made a satisfactory recovery. The stools when examined contained large numbers of vegetative forms of *E. histolytica* and ingested red blood cells.

The second was a middle aged female whose history suggested that she had had previous attacks which had never been diagnosed or treated. Her general condition was not good and she was slow to respond to treatment by emetine.

The third case was most interesting, being that of a male child aged 2½ years. The onset was most dramatic with a temperature of 102°F accompanied by severe vomiting and the passage of very frequent stools which contained blood and mucus. Altogether in 12 hours he had 19 motions and vomited 12 times. The onset was much more suggestive of a bacillary dysentery or a malaria of intestinal type, but the stools macroscopically resembled amoebic dysentery stools and microscopically the field was composed almost enclusively of red blood cells and vegetative forms of *E. histolytica* containing numerous red cells.

RELAPSES.

Of the 108 cases reported it appears from the records available that no less than 44 had a history, either of previous dysentery or of attacks of diarrhoea with the passage of blood and mucus. Many of these cases had been treated in previous years with magnesium sulphate, possibly on the assumption that they had acquired bacillary dysentery.

64 cases had no previous history of this nature but it is interesting to note that no less than 15 had, during a period of 2 years before the diagnosis of dysentery was made, been treated for such diseases as dyspepsia, diarrhoea and enteritis although no evidence of the passage of blood on these occasions is available.

In 6 cases a history was obtained of the occurrence of the disease in another member of the same family or group of people living together, more than one year previously.

AMOEBIASIS IN CHILDREN.

Until 1933 there is no record of the disease occurring in children under the age of 14 years but it is possibly a significant fact that on at least four occasions, cases of so called enteritis were treated in children who came from houses where one or other parent had suffered from dysentery. No attempt appears to have been made to examine for amoebae, stools from these cases or others of a diarrhoeal nature.

From 1st January 1934—15th January 1935, 11 cases have been recorded in children under the age of 10 years.

Of these, eight were diagnosed by one of us (L.C.M.) as the result of microscopic examination of stools. One case has already been referred to in our earlier paragraph.

Two cases may be of special interest:

(1) A male child aged 6½ months who, until one month previously had been breast fed, commenced to pass frequent stools which to the naked eye contained some mucus. Microscopic examination revealed the presence of red blood cells and vegetative forms of *E. histolytica* with ingested red cells in large numbers.

(2) A child aged 3½ years who was treated early in 1934 relapsed early in January, 1935, the stools containing mucus, blood and *E. histolytica*.

In all these children the onset has been rather more severe than is usual in adults, the temperature rising to 101—102°F and vomiting has been a feature.

The recognition of these juvenile cases is of particular interest as Manson Bahr (1934) is quoted in the Tropical Diseases Bulletin as stating that "Amoebiasis is a rare disease in European children and he has never seen or treated a genuine case of amoebic dysentery in a child under 10 years of age".

TREATMENT.

Treatment of adult cases in former years consisted of subcutaneous or intramuscular injections of gr. 1 of emetine hydrochlor, daily for 12 days followed in many instances by stovarsol tablets, one tablet daily for 7 days. The four cases of amoebic hepatitis reported were treated in this manner. On the case charts of two of these, a note is made that "a considerable reduction in the number of cysts present in the stools occurred following the administration of stovarsol".

Cases of a more chronic nature were treated with emetine bismuth iodide grs. 3 daily for 10 days and at the same time yatren enemata (200 c. c. of 2% solution) were administered daily for a similar period.

It has been the experience of one of us (L.C.M.) during the last year, that a combination of emetine hydrochlor intramuscularly with quinoxyl per rectum has a more rapid and lasting effect; abdominal discomfort is quickly relieved. One grain doses of emetine hydrochlor, were given once daily for 8—10 days and during this period a daily enema of 200 c. c. of 1% solution of quinoxyl was administered. Patients were instructed to retain the latter as long as possible.

Emetine per-iodide by mouth was commenced in several cases but was badly tolerated and its use was discontinued. It is proposed presently to introduce treatment with carbarsone as soon as supplies are available.

Emetine was not given to children. All juvenile cases were treated with ¼ to ½ quinoxyl tablet thrice daily by mouth for 10 days and ½-1 per cent. quinoxyl enemata, the latter varying in quantity according to age. The immediate results of treatment have been satisfactory.

Diets were carefully regulated in hospital cases but there was no appreciable difference in the results of treatment in out-patients who were unable or unwilling to adhere to the dietary recommended. In the case of children rigorous dieting was not resorted to.

DIAGNOSTIC TECHNIQUE.

Each specimen of faeces was emulsified in normal saline solution. Two slides were then prepared, one of the faecal emulsion, and one specimen stained with double strength Gram's iodine solution.

The following special Investigations were undertaken during 1934.

(1) EXAMINATION OF SPECIMENS OF FAECES FROM NATIVE SERVANTS OF EUROPEANS.

In March and April, 1934, an examination of specimens of faeces from house servants of Europeans was undertaken to ascertain the incidence of *E. histolytica* amongst them. The Medical Officer, Zomba, was responsible for the collection and, the Pathologist for the examination of the specimens.

Four hundred and twenty-seven specimens were examined, of this number seven were found to contain *E. histolytica*, a percentage of 1.56. Two of the positive stools were received from boys employed as cooks; in neither household had European cases of Amoebiasis occurred. Two cases had occurred in households at which two of the five remaining positive cases were employed. It was not possible to draw any definite conclusion from these findings: the positive figures were too low and the case distribution was irregular.

It is worth placing on record that 40 per cent. of the 427 specimens examined were found to contain *E. coli*.

In view of the risk run by all residents of contracting Amoebiasis, it was considered that the investigation would have been welcomed by supposedly intelligent Europeans. It is regretable, therefore, to have to state that fifteen European householders refused their boys permission to submit specimens for examination. A case of amoebic dysentery subsequently occurred in the family of one of these householders.

(2) EXAMINATION OF SPECIMENS OF FAECES FROM INMATES OF AND NEW ADMISSIONS TO THE CENTRAL PRISON AND LUNATIC ASYLUM, ZOMBA.

The Central Prison, Zomba, is situated on the outskirts of the township. The average number of prisoners accommodated is about 450, almost all of whom are long sentence criminals drawn from every district in the Protectorate; on occassions Hut Tax Defaulters are admitted in considerable numbers for short sentences.

On admission, a specimen of faeces from each prisoner is examined as a routine for the presence of ovae of helminths. In April, 1934, it was decided to examine the stools not only of newly admitted prisoners but also of all inmates, with a view to determining the incidence—if any—of carriers of *E. histolytica*.

During the nine months ending 31st December, 1934, specimens were procured for examination from four hundred and five prisoners. The vegetative form of *E. histolytica* was found in one specimen only but *E. histolytica* cysts were present in forty.

In the course of the examination of specimens of faeces obtained from 97 Hut Tax Defaulters on their admission to the Central Prison, cysts were found in fifteen. All these defaulters were residents of one Administrative District. Appropriate treatment was instituted until the stools became parasite free, after which two examinations were made at weekly intervals.

These carriers are a potential danger not only to other prison inmates but also to the population of Zomba. On occasions, prisoners are employed on works within the township and under such circumstances promiscuous defaecation is likely to occur.

Cases of amoebic dysentery have been reported at the Central Prison from year to year, but numbers never became alarmingly large as treatment was always commenced promptly.

Ninty seven faecal specimens from inmates of the Central Lunatic Asylum were also examined; *E. histolytica* cysts were found in nine of them.

3. FLY SURVEY, ZOMBA BY THE MEDICAL ENTOMOLOGIST.

Soon after his arrival in the Protectorate, the Director of Medical Services arranged for the Medical Entomologist, Dr. W. A. Lamborn, to make at his earliest convenience, a survey of the breeding places in Zomba, of the domestic species of fly.

Dr. Lamborn commenced the survey on 17th September, 1934, and his report submitted subsequently, verified a state of affairs that had been suspected but not previously confirmed.

The following is an extract from his report:

> "The more common species of fly found were
>
> (*a*) *M. domestica* occurring most abundantly in fermenting vegetable matter and human excreta.
>
> (*b*) *M. spectanda*, Wied.
>
> (*c*) Sarcophaga species?
>
> (*d*) Lucilia, Orthellia and Morellia species?
>
> (*e*) *M. vetrosa* and *M. vicina* breeding in fowl manure.
>
> It was found that breeding was taking place to a considerable extent in the vicinity of latrines and in the rubbish pits and dumps within the township. Further investigation revealed that where faulty construction of the latrine did not contribute to fly breeding, the deposition of fresh faeces around the perimeter of the latrine was largely responsible; there was evidence that this was occurring daily. On the exposed excreta flies were engaged in ovipositing. At the K.A.R. camp where excellent deep pit latrines are provided a similar state prevailed. Freshly deposited excreta occurred not uncommonly in the immediate vicinity of latrines, particularly those screened from observation by vegetation.

> Evidences were found of the practice usual among natives when in their own villages of defaecating by night near their own quarters in little pits scraped by hand. These are then covered with just a sufficiency of earth to ward off discovery and form potential breeding places for flies.
>
> Inadequate disposal of the night soil from native latrines seemed a main factor responsible for the plague of flies. The material is at present buried in the immediate vicinity of each latrine, close to the surface and almost invariably under such a scanty covering of earth that it is possible to discover fly larvae by stirring the surface with a stick. Many of these dumps are situated in damp ground such as favours the larvae at the present season.
>
> I have no doubt that the system now being inaugurated whereby the material will be collected and dumped into pits twenty feet deep and covered in except for a narrow opening at the top proofed against flies, will provide as good a measure of control against flies as is possible until such times as a water flushing system can be installed at all houses".

Sufficient has been quoted to indicate the state that really existed.

FACTORS INFLUENCING THE DEVELOPMENT OF FLIES.

Although the house fly *M. domestica* prefers horse manure in which to oviposit, human faeces are also a favoured and equally suitable media.

According to Hewitt (Patton 1929),

> "at a temperature of about 68°F, larvae bred in moist faeces will develop fully in twenty days and he concluded as a result of a series of experiments that wherever a continuous high temperature occurred there was a corresponding shortening of the particular stage of development, and "vice versa" when the temperature was low, the time of all stages was lengthened; this included the three larval stages, which were short or long according to temperature".

Patton (1929) records that Dunn has recently made some exact experiments on the oviposition of *M. domestica* in Panama during the months of January, February, and March, when the mean relative humidity was 76 to 81.4%. He summarises the result of his observations on 42 pairs of flies kept in captivity as follows:

> "Copulation may occur within twenty-four hours of emergence. One successful copulation seems to fertilise the female for her life period. Oviposition may take place as early as two and a quarter days after emergence. As many as 159 eggs may be deposited in one batch. Large batches are sometimes deposited at intervals of about 36 hours. One female may deposit as many as twenty one batches or a total of 2,387 eggs in thirty one days after emergence".

It has already been recorded by Dr. W. A. Lamborn in his report that an ample larval food supply was in the past always available in Zomba and, reference to the meteorological table will show that during the greater part of the year, conditions of temperature and moisture are favourable for fly development.

TRANSMISSION of *E. histolytica* CYSTS BY INSECTS.

The part which *M. domestica* and its allies play in the transmission of intestinal protozoa has been carefully studied by a number of observers.

According to Thomson and Robertson, (1929), Thomson, J. G., and Thomson, D., in 1916 drew attention to the fact that

> "flies fed on faeces containing cysts of *E. histolytica* could carry the cysts in their alimentary canal and pass them unchanged in their dejecta. Wenyon and O'Connor (1917) confirmed this observation and stated that living cysts could be found in the faeces of flies for fully 16 hours after the infective feed. It is also stated by Thomson and Robertson that Buxton (1920) in a series of dissections of 1,027 flies, found that 63 per cent. contained "apparent" faeces, 4.09 per cent. human intestinal parasites and 0.3 per cent. cysts of *E. histolytica*. Of flies collected from Arab compounds 80 per cent. contained faeces, from Indian latrines 76 per cent. and from British mess and cook houses 61 per cent. From this it is concluded that the fly can be regarded as definitely incriminated as a disseminator of the cysts under natural conditions".

SANITATION.

According to the Nyasaland Handbook, Zomba was first occupied as an Administrative centre about 1887, and from that date until quite recently the method of disposal of night soil and household refuse was of the most primitive.

Apparently it has been customary from the date of occupation to dispose of night soil by trenching and of rubbish in shallow pits. The onus of disposal was thrown on the householder and as very little supervision was exercised over the activities of the boys detailed for this work, it is hardly necessary to add that the work was rarely if ever performed efficiently.

Latrines of the bucket type—inadequately protected against fly invasion—were provided for the needs of house servants and native visitors as the town extended. It is almost superfluous to remark that on many of the occasions these latrines were used, they were also abused. Being scattered over a wide area, the sanitary staff was never adequate to supervise them properly;

buckets were left uncovered and nuisances were committed on the floors of the buildings in preference to using the containers provided. The material from latrines was buried daily and as it was less trouble for the attendant to excavate a shallow hole in the immediate vicinity, than to bury the material deeply, fouling of the surroundings soon occurred.

Great difficulty has always been experienced in getting the natives to make use of latrines. Owing to the luxuriant vegetation and the presence of banana groves, promiscuous defaecation was the general rule and even to the present day this filthy habit has not been brought completely under control.

That the state of affairs was unsatisfactory was realised many years ago. As early as 1905, Dr. Fox called attention to the large number of native huts in close proximity to European houses and asked for adequate latrine accommodation. Practically every Annual Medical Report from 1912 onwards offers recommendations for the improvement of the sanitation of Zomba; few, if any were acted upon.

In the 1914 Annual Medical Report references are made to the adoption of a conservancy system but apparently the onset of the Great War was responsible for the failure of this scheme to materialise. The necessity for such a system was not lost sight of and in 1916 a Committee consisting of Dr. Hearsey, Principal Medical Officer, T. J. Binnie Esqr., C.M.G., Director of Public Works and Dr. Norman Leys was formed for the purpose of submitting recommendations and estimates of cost of sanitary works necessary in Zomba. This Committee duly advised the introduction of a pipe borne water supply; a conservancy system of night soil disposal; the erection of ten destructors and a surface water drainage scheme. Unfortunately it was decided that nothing should be done until the War terminated.

In 1920, an order was placed for the purchase of latrine pans, rubbish bins and carts for the transport of night soil but in 1921 it is recorded that "no change had taken place in the sanitation system owing to the non-arrival of equipment".

From correspondence dated 1922, it would appear that the items ordered did arrive eventually but were not then utilised owing to failure of Town Council to provide funds for supervision of the scheme. After this date all reference to the equipment ceased and apparently as the result of a dispute on the question of rating of officials house, the whole scheme lapsed.

A letter written at this period by a resident of Zomba to the Medical Officer, illustrates the existing state of affairs. It commences by acknowledging a communication on the subject of the ashpit at his house and continues as follows:—

> "The space available in my compound for latrine pits is not more than ten yards square. Whenever I start digging a new pit I find I am opening up an old one. Even this space, fouled as it is by years of soilage is far too close to the house, kitchen and also to the public road. There is not the slightest doubt that the time has now arrived when this present method of disposal is attended with grave danger to the inhabitants of the town."

Things had reached such a state that it had become necessary to cease burying night soil in trenches and the system of opening shallow pits had been resorted to. Night soil buckets were emptied daily into a pit in the compound and a covering of earth thrown on top. When the contents reached to within two feet of the surface, the pit was filled with earth and a new one opened.

This system was subject to many disadvantages, one of which was that the layer of earth over the underlying rock was comparatively shallow in many compounds. Residents objected to "wasting" two feet of pit and in some cases deposits of faecal material were made up to surface level. Public latrines were sited in isolated places and the excreta buried daily in small excavations sufficient for the occasion, the depth being dependent upon the energy of the attendant.

Until comparatively recently, it was considered that burial of night-soil at a depth of nine to twelve inches provided an efficient barrier to the emergence of adult flies from eggs which had been deposited in faeces previous to burial.

Patton (1929) in a reference to the migratory habits of third stage larvæ of *M. domestica* states:—

> "The third stage larva of *M. domestica* grows rapidly and at a temperature of 77°F. it will complete its period of growth in about three or four days. It then enters on a short resting period, during which time it does not feed, then empties its alimentary tract, assuming a creamy white colour due to the large amount of body fat accumulated during this stage. At the end of this period which lasts a few hours, the larve migrates from its food, leaving it, as a rule, at night, and crawling some distance, buries itself in the soil at a depth varying from three inches to about two feet, depending on the nature of the soil."

An experiment was carried out by Hewitt (Patton 1929) to ascertain the distance and depth travelled by larvæ before pupating. A heap of horse manure was placed on sandy loam, and after all the larvæ had migrated, it was removed and the soil examined for puparia. The result of the examination was as follows:

> "A few puparia were found beneath the manure pile to a depth of twelve inches. The greatest number occurred about eighteen inches from the pile at a depth of twelve inches to two feet from the surface; puparia were also numerous immediately beneath the surface of the soil. The numbers then gradually decreased, proportional to the distance from the pile and dwindled away at a distance of about four feet from its base."

As puparia are found under natural conditions at a depth of two feet it is presumably correct to assume that the imago is able to push its way to the surface through this layer of soil. Therefore burial of faeces on which flies have oviposited should be at a greater depth than two feet. The covering soil must be firmly packed down. Stiles and McMiller (Patton 1929) have shown that if larvæ are buried under sand to a depth of "four or six feet", they will crawl upwards and pupate just below the surface, thus enabling the adults to emerge safely.

The inauguration of the Colonial Development Fund in 1930, opened up possibilities of at last improving the sanitation of Zomba. Money was allocated for the introduction of a water carriage system emptying into small septic tanks but as this scheme was dependent upon a pipe borne water supply the latter necessarily was given precedence. This was duly completed and in 1933 work commenced on a septic tank system.

Owing to various delays, it became obvious in the middle of 1934 that steps must be taken to improve the existing system pending the completion of the required number of septic tanks. The notification of cases of amœbic dysentery in July and August was viewed with alarm and it was obvious that there was every danger of this or even a more serious intestinal disease becoming epidemic during the approaching rainy season.

The following plan was decided upon. Fifteen pits varying in depth from 20 to 25 feet and 6 feet in diameter were excavated; in many cases this necessitated blasting with dynamite through solid rock in order to attain the necessary depth. Each pit was equipped with a cement top 3 feet by 2 feet 6 inches with a central aperture 1½ feet by 1 foot over which a box fly trap was fitted. The pits were sited at suitable points within the township.

Before this work was completed Dr. W. A. Lamborn's report was received. Steps were taken immediately to deal with the reported fly breeding areas and to prevent the recurrence of the nuisances detailed by him. Immediately each pit was fully excavated and fitted with the necessry equipment, arrangements were made for the collection and deposition of household night soil once daily and the contents of public latrine buckets twice daily, in the zones served by the completed pits. Burial of night soil in compounds and in plots adjacent to public latrines ceased on 1st November, 1934.

Flies (specimens of which have been sent for identification) were caught in considerable numbers in the traps placed over the pit apertures, indicating that egg laying was still taking place, most probably in the excreta contained in the public latrine buckets.

To prevent this occurring, disinfectant was added to the buckets each time after emptying them; a larger staff was engaged to clean the latrines and supervise the replacement of bucket lids, and efforts were made to reduce the numbers of adult flies in the vicinity of latrines by placing there, poisoned baits and frequently spraying with disinfectant the buckets and any contents not already submerged in disinfectant.

As it was proved by the Medical Entomologist that fly breeding occurs freely in decaying vegetable matter, it was decided by extensively reducing the number of mango trees to cut off this source of larval food supply.

Banana groves which had afforded so much cover for promiscuous defaecation were also cut down and attempts are being made to exterminate the growth of this fruit throughout the township.

In spite of this improved method of dealing with night soil and house refuse, twenty-one cases of amoebic dysentery occurred in November and December. What would have been the state of affairs had no improvements been effected?

Meanwhile, Zomba Town Council allocated funds for the purchase of rubbish carts and the construction of a closed "Beehive" type incinerator. Household refuse is now transported to the incinerator, though the disposal of night soil into pits, from public latrines and from houses not yet fitted with septic tanks, still continues. At the end of December, 1934, twenty eight water flushing installations had been completed at officials quarters and work was proceeding at nineteen other residences. It is anticipated that by the end of 1935, every European residence will be so equipped and that a number of water flushing public latrines will have been completed for the use of Africans.

Native women and children are the most serious offenders with regard to promiscuous defaecation. Although this communication is only an "Outline of the history of amoebic dysentery and of the sanitary conditions prevailing in Zomba throughout the years" and is not a "Sanitary Survey" necessitating the making of recommendations, it may not, however, be inappropriate to state it is our opinion that:

(1) The total extermination of flies in Zomba cannot be accomplished.

(2) As long as natives are permitted to live in close proximity to European houses in surroundings provided with ample cover encouraging promiscuous defaecation, nuisances will occur in spite of the most rigorous supervision.

Over 25 years ago the question of a Native Location was discussed. A few houses were provided for a number of menials but the complete removal of all natives from within the township was not contemplated.

In 1934, work commenced on the construction of houses at the location on such a scale that it is hoped eventually to provide accommodation for all "township" natives in one area.

The completion of this scheme will facilitate the removal to a distance of those natives, who, by their habits constitute a menace to the health of the European community.

In a location it will be possible by supervision, instruction, and the provision of suitable accommodation to instil into them the rudiments of sanitation.

SUMMARY OF METEOROLOGICAL OBSERVATIONS.

Rainfall during November and December 1932 = 14 inches.

	Pressure reduced to 32°F Lat. 45 degrees at station level.		Air temperature						Humidity		Rain.
			Dry Bulb		Wet Bulb						
			9 hr.	15 hr.	9 hr.	15 hr.	Max.	Min.	9 hr.	15 hr.	ins.
				19	33				%	%	
January Means ...	26.725	26.647	72	74	68	70	79	65	81	79	10.86
February ,, ...	26.734	26.637	73	78	67	70	80	65	75	67	4.97
March ,, ...	26.793	26.714	72	77	67	69	80	65	76	65	8.48
April ,, ..	26.924	26.831	70	75	64	68	79	61	72	69	.46
May ,, ...	27.025	26.947	68	74	59	61	78	56	59	44	.09
June ,, ...	27.016	26.951	65	72	59	63	77	55	67	57	1.11
July ,, ...	27.085	26.989	63	71	56	66	73	52	64	77	.22
August ,, ...	27.062	26.963	64	74	56	67	76	52	60	71	.04
September ,, ...	27.039	26.899	68	76	58	60	78	58	51	36	.21
October ,, ...	26.913	26.800	75	82	63	65	86	63	49	36	—
November ,, ...	26.872	26.597	75	82	66	63	86	67	59	42	3.81
December ,, ...	26.872	26.762	70	75	66	67	79	63	77	68	11.04
				19	34						
January ,, ...	26.813	26.727	73	78	68	68	81	64	74	58	5.47
February ,, ...	26.809	26.721	73	75	68	69	81	64	76	74	10.08
March ,, ...	26.876	26.798	72	76	68	69	80	64	78	70	9.90
April ,, ...	26.960	26.893	71	76	66	67	79	62	76	60	2.98
May ,, ...	27.005	26.947	70	75	64	65	78	57	71	58	.09
June ,, ...	27.077	27.026	64	69	60	64	72	57	81	78	1.14

SUMMARY.

(1) Amoebic Dysentery has been endemic in Zomba for many years.

(2) The disease is not confined to adults; children also acquire it.

(3) No treatment is specific, relapses have occurred subsequent to treatment by various combinations of drugs.

(4) "Missed cases" probably occurred during the years that no cases were recorded.

(5) Conditions favourable for the development of vectors prevail.

(6) 1934 was the "peak year" and a decline in the number of cases in future years may be anticipated in view of the introduction of improved methods of Sanitation.

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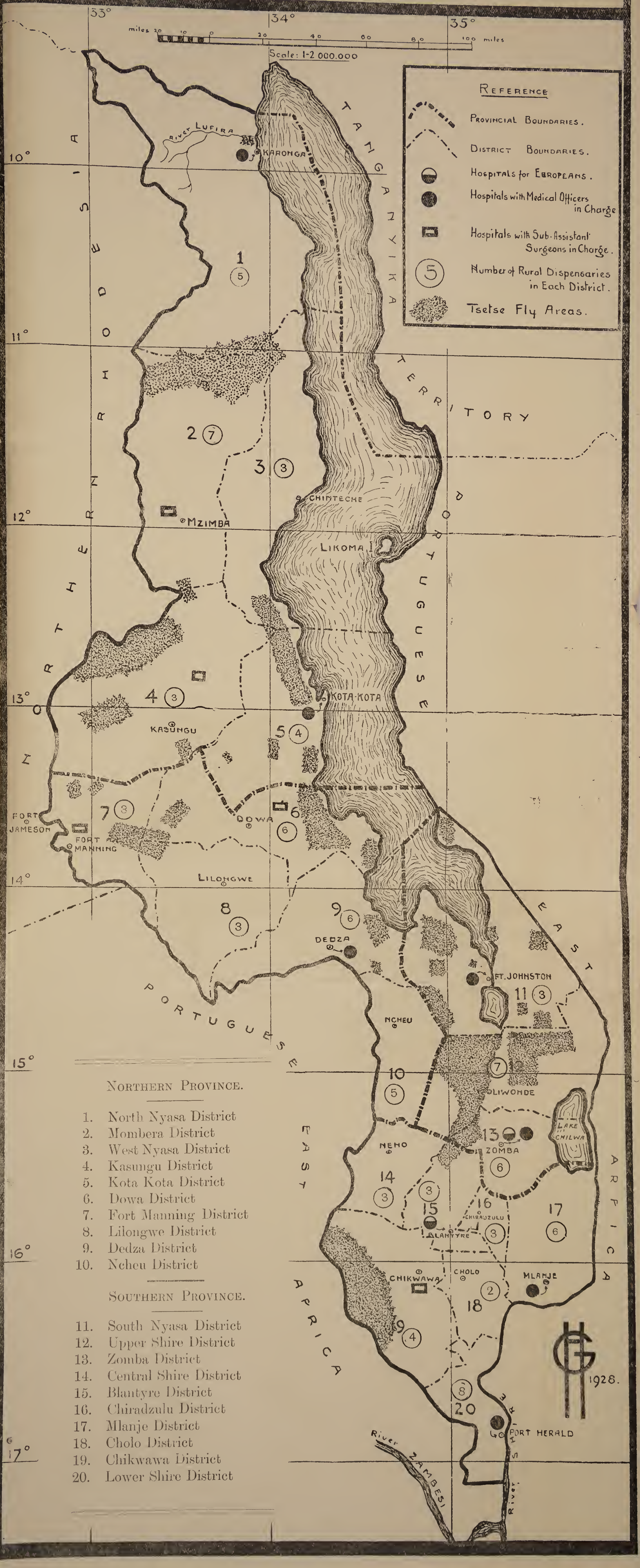
NYASALAND PROTECTORATE



Northern Province.

1. North Nyasa District
2. Mombera District
3. West Nyasa District
4. Kasungu District
5. Kota Kota District
6. Dowa District
7. Fort Manning District
8. Lilongwe District
9. Dedza District
10. Ncheu District

Southern Province.

11. South Nyasa District
12. Upper Shire District
13. Zomba District
14. Central Shire District
15. Blantyre District
16. Chiradzulu District
17. Mlanje District
18. Cholo District
19. Chikwawa District
20. Lower Shire District